Chemical Age

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O.C.C.A. Preview (page 363)

VOL. 85 No. 2173

4 March 1961

THE WEEKLY NEWSPAPER OF THE CHEMICAL INDUSTRY

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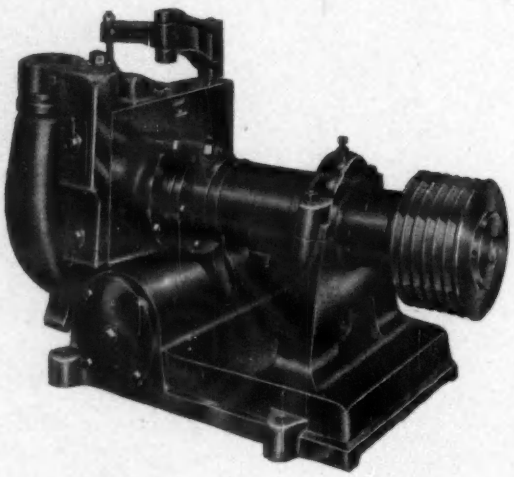

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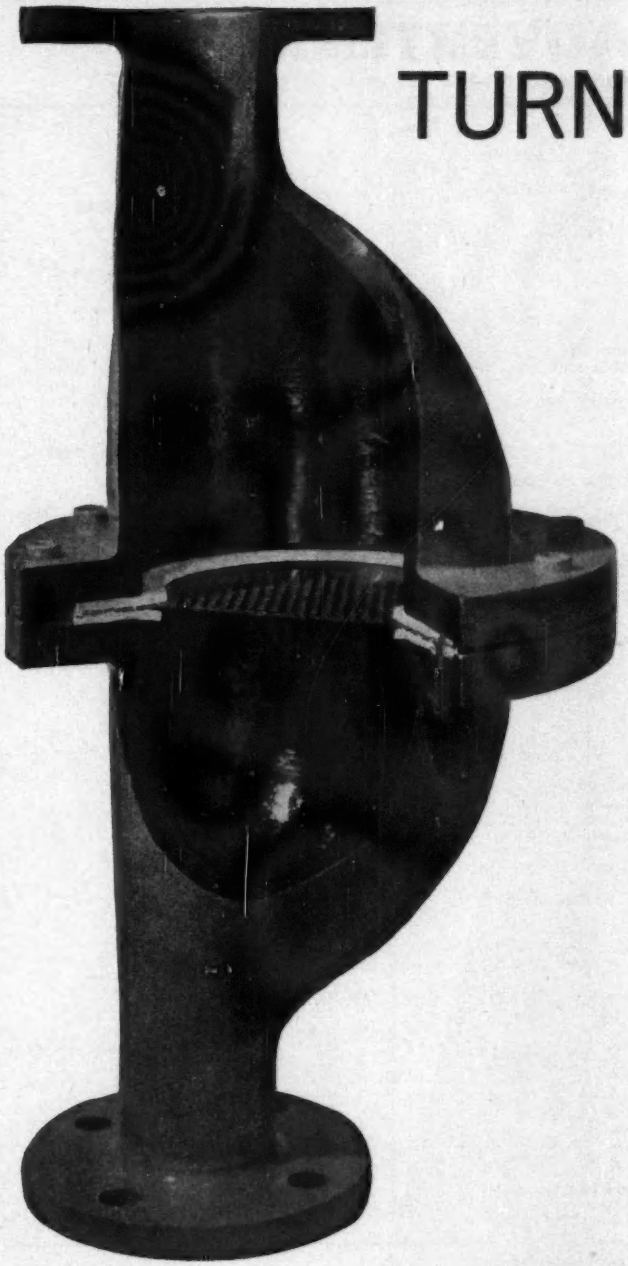

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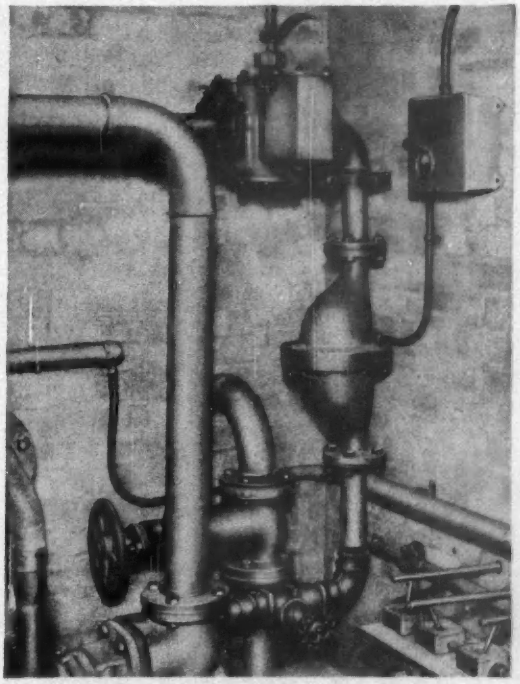

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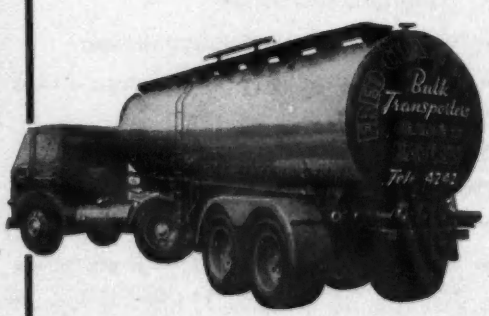

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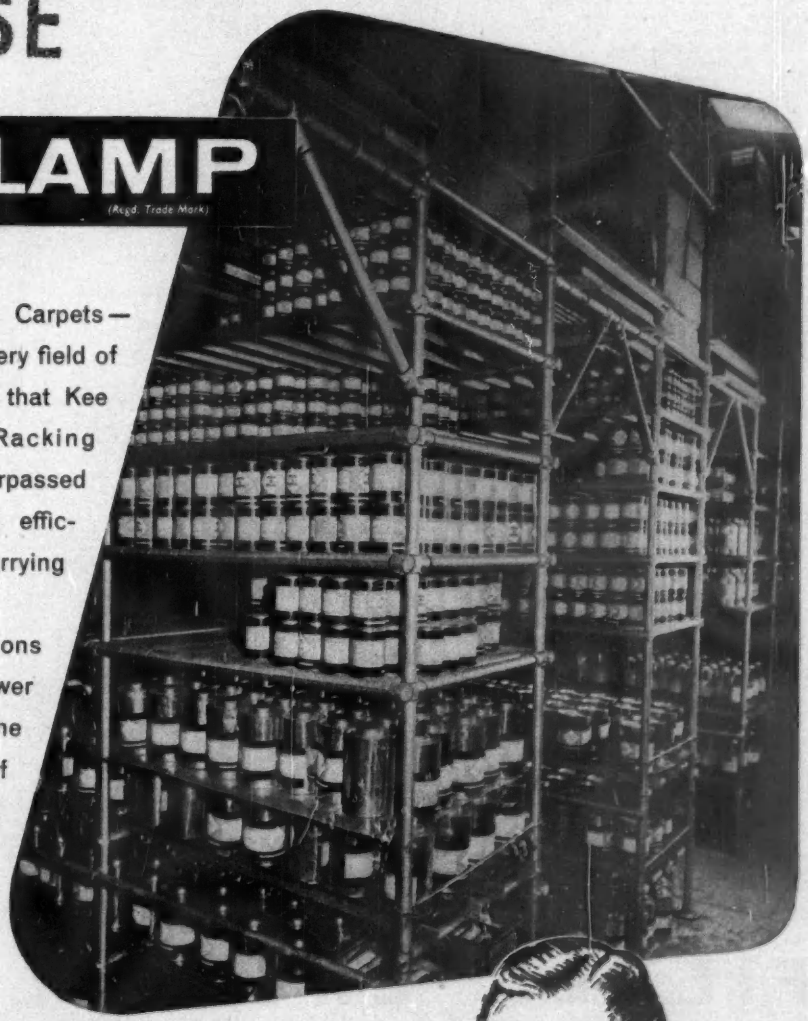

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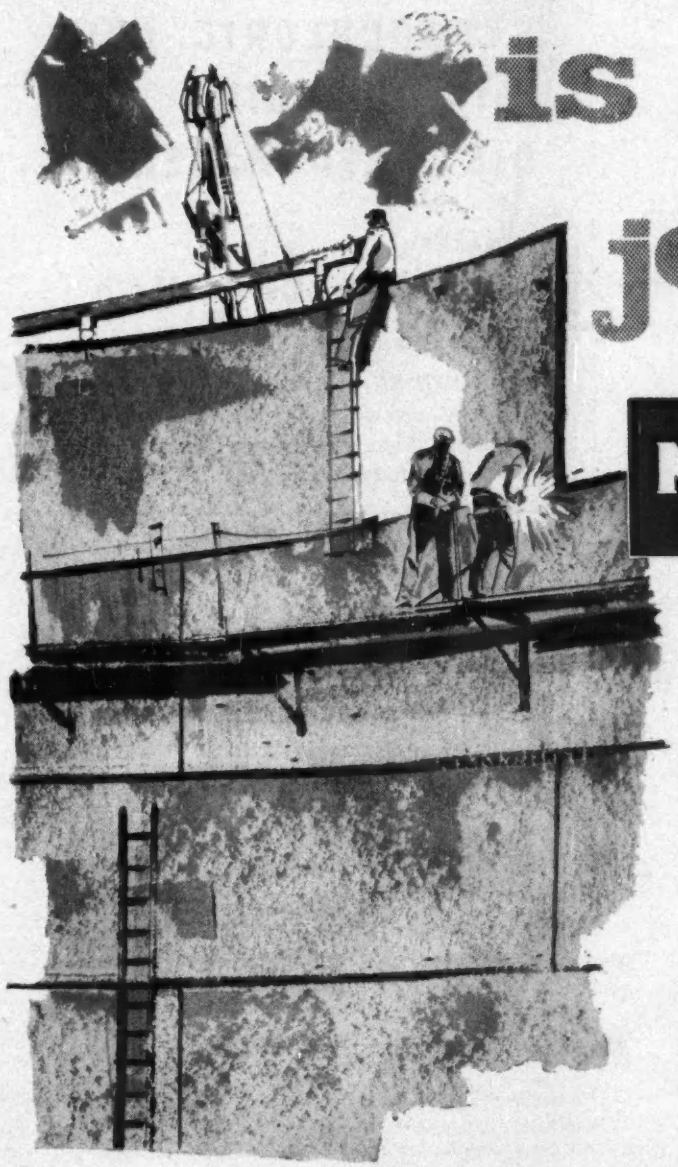

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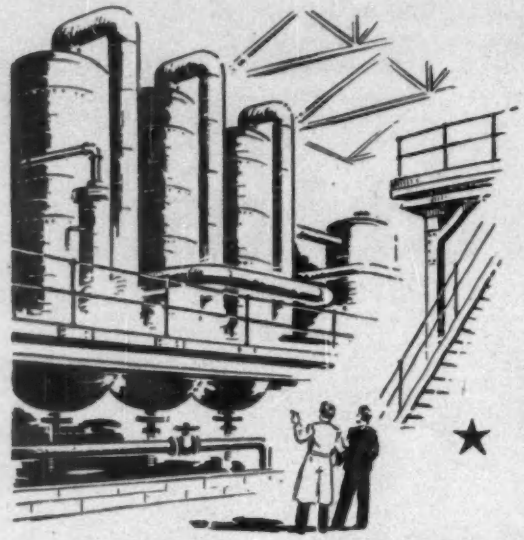

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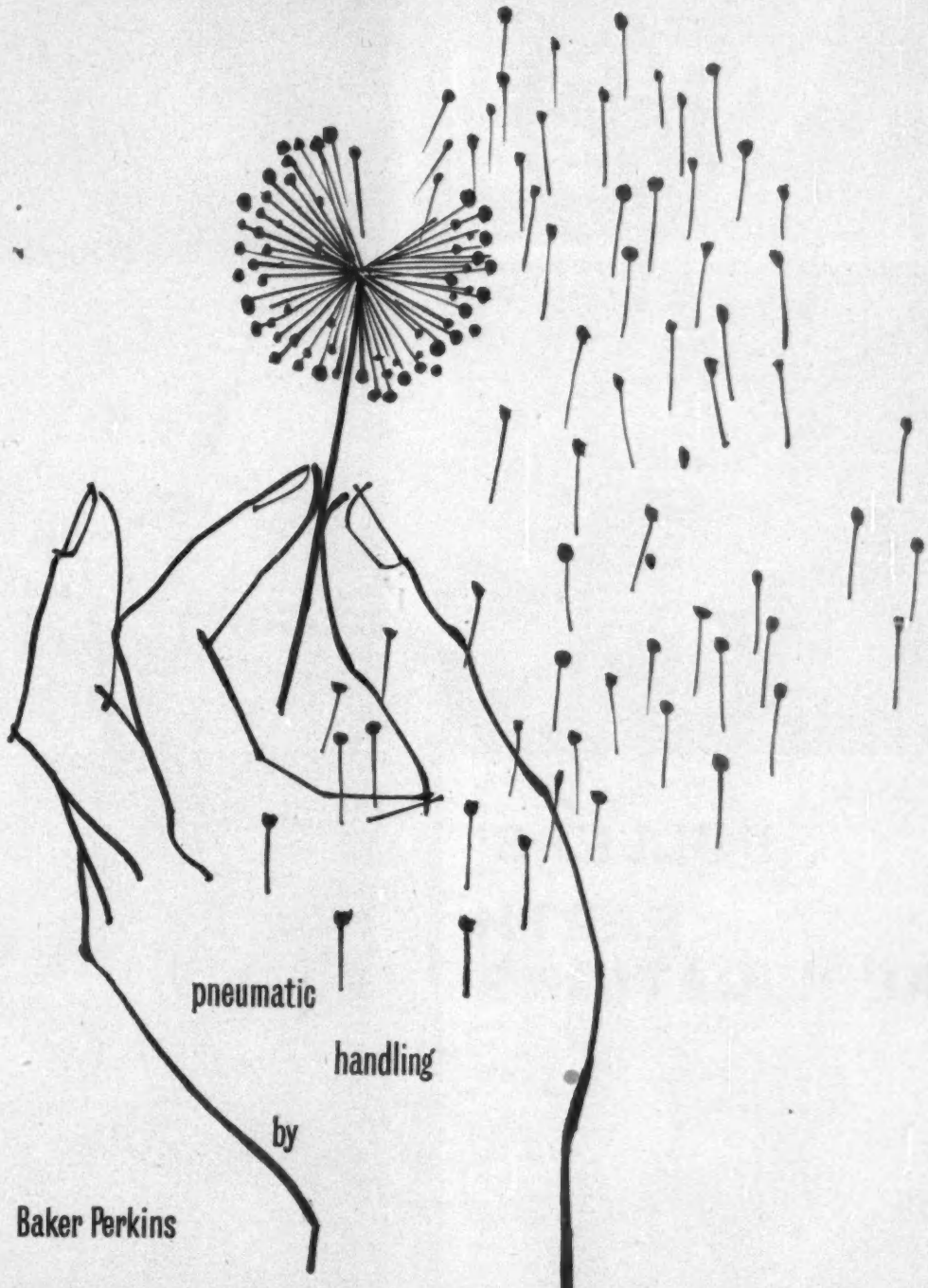

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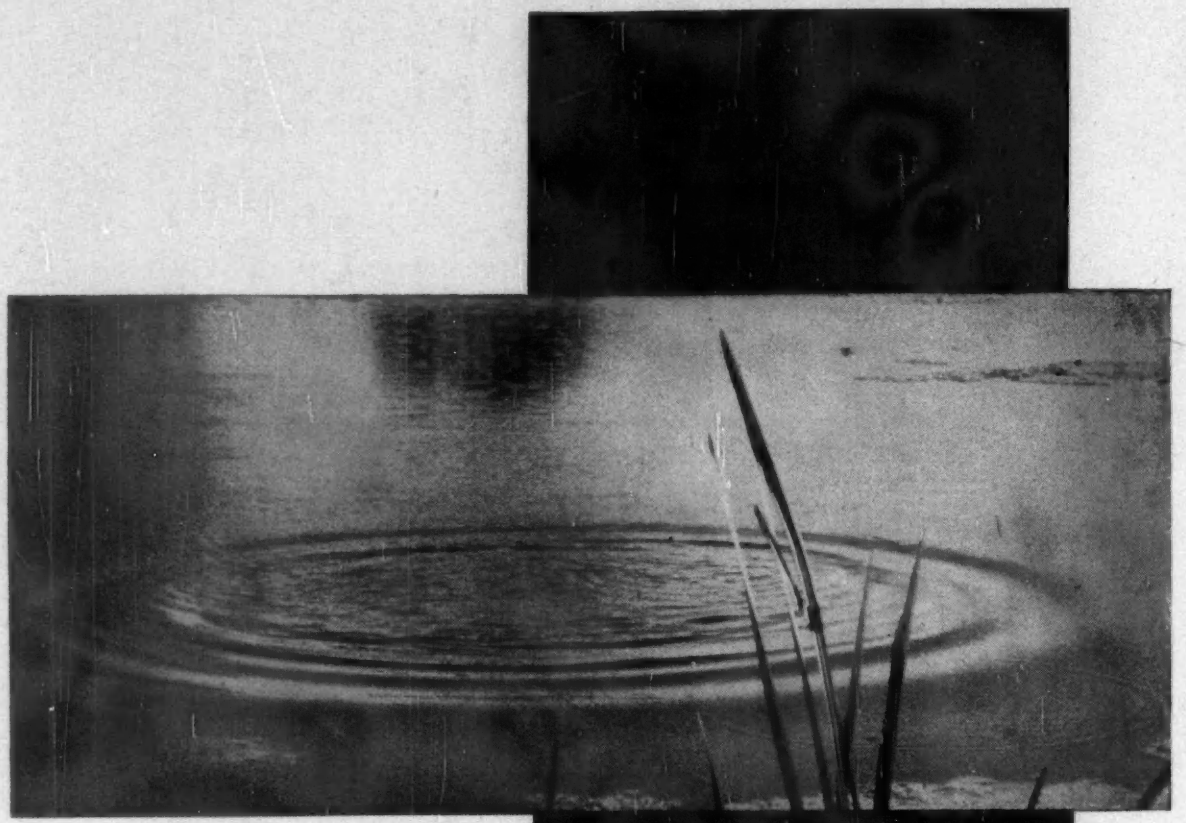

FULLERS' EARTH APPLICATIONS

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CHEMICAL AGE

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IN THIS ISSUE

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SAHARAN GAS

THE recent disclosure that the Gas Council is negotiating for the regular importation of large quantities of liquid natural gas from the Sahara (CHEMICAL AGE, 25 February, p. 320) raises the question whether there is any likelihood of U.K. gas production being largely based on natural gas at some time in the future. It also appears to bring nearer the possibility of importing methane as a cheap raw material for chemical synthesis—we already have some examples of its benefits on the Continent, where vast pipeline systems are being laid to bring natural gas from the Sahara, Lacq and elsewhere to the industrial centres. Indeed, when the considerable usage of natural gas in the U.S. and Canada, not to mention the U.S.S.R. and kindred countries, are considered, it might well be wondered whether the U.K., even allowing for the absence of any close-by natural gas deposits, has not been a little backward in finding ways of exploiting this useful material. The Gas Council's experiences in importing methane by sea tanker may well point the way to this development.

For the moment, however, the question at issue is that of importing only enough natural gas to account for some 15% of U.K. gas sales, and even this has been quite enough to raise a storm of controversy that is likely to continue for some time. It is to be hoped that a sense of perspective will be maintained as far as the outspokingly critical coal lobby is concerned. Britain's coal industry is too important to the national economy to allow it to become run down but it would be wrong to deny the gas industry access to a cheap and abundant new raw material.

The Gas Council has shown, by the considerable sums it has spent and is still spending on coal gasification, that it is as anxious as anyone that Britain's gas supplies should be based as far as possible on coal. Nowhere is this more evident than in its expensive projects for the complete gasification of low-grade coal by the Lurgi process. This is the chief alternative to imported methane at present.

In the recent fuel and power debate in the House of Commons, it was suggested by Mr. William Blyton, an Opposition Member, that the Lurgi plants should be on the scale of using 1 million tons of coal a year, and should be situated adjacent to collieries to cut transport costs, if full economic and technical benefits were to be reaped by them. He felt that the Gas Council was tending to "desert" the coal industry, because it was planning to reduce the proportion of gas-from-coal from the present 65% available to 55% by 1966, "and it could possibly be much less if the importation of methane were allowed on a large scale."

In reply, the Parliamentary Secretary to the Ministry of Power, Mr. J. C. George, gave an assurance that all aspects of methane importation would be considered before a decision was taken, and that the N.C.B. would be consulted. Ministerial emphasis had been given to the view that the future lay with gasification other than methane. He pointed out that the first Lurgi plant which has come into commission at Westfield, Fife, is operating as expected; this plant, together with a second plant being erected at Coleshill in the Midlands, would yield valuable experience.

(*Continued on page 370*)

I.C.I.'s £100 m. Stake in Common Market

Petrochemicals Complex for Rotterdam Plus Plants Elsewhere in C.M. Area

A MAJOR change in company policy will give Imperial Chemical Industries Ltd. their first-ever petrochemicals complex on the Continent and take them behind the Common Market tariff wall. As announced late on Tuesday, I.C.I. will have a site at Europoort, Rotterdam, comparable to their petrochemical complexes at Severnside and Wilton.

Up to £100 million has been authorised for investment in the next 10 years on a 300-acre site which is now under negotiation. I.C.I. will build plants for petrochemicals, plastics raw materials and other chemicals, with construction scheduled to start early in 1961. First plants should be on stream by 1964.

In addition, I.C.I. are to build other units, possibly on an individual plant basis, in other parts of the European Economic Community.

No statement has been made of the products involved. These might well include ethylene, propylene and ethylbenzene, major building blocks for plastics, unless, as at Severnside, supplies of olefins are contracted for from outside sources. Oil crackers are not likely to feature, since feedstock is obviously available in the Rotterdam industrial area. Although Holland will have at least three polythene plants before long, it is expected that this product will be featured together with Terylene and possibly nylon. Owing to licensing arrangements which give Royal-Dutch Shell and Montecatini production rights in the Netherlands, it seems unlikely that polypropylene will be included.

Divisions of I.C.I. likely to be concerned with the new plant could well be Heavy Organic Chemicals, Billingham, General Chemicals, Plastics, Fibres and Dyestuffs. In the case of the latter I.C.I. might well decide that there is room for more than one continental producer of isocyanates.

Major Chemical Centre

Rotterdam is a natural choice for the new complex because not only is it being developed as a major port for the E.E.C. countries, it is also becoming one of Europe's largest chemical production centres with heavy U.S. investments in the area.

Previously I.C.I. have avoided heavy commitments on the Continent, although they have a joint polythene venture in Denmark (their first joint production) and license many of their processes for use on the Continent. The company has been preparing for this change in policy since July last when a European Council was set up to review the position and make recommendations. This council has now been established as an operating board under the chairmanship of Mr. D. M. Bell, who aged 46, has been joint managing director of the Heavy Organic Chemicals Division since January 1958. This board will supervise I.C.I.'s interest in West Europe as a whole and will report to Dr. A. Caress, one of the company's overseas directors.

This decision reflects the company's intention to pursue a vigorous drive for chemical business in West Europe—an area that has always been an important market for I.C.I., who stress that the setting up of plants on the Continent would not mean any relaxation of efforts to increase the U.K. exports. Not only have I.C.I. a bigger footing in Europe than any other U.K. producer, they will also have a larger plant complex than any of the 500 U.S. chemical producers who have been investing so heavily in the area in the past few years.

The E.E.C. chemical industry is growing at a rate faster than that of any other area of the world, including the U.S. Consumption of chemicals is reportedly five times as great as in Britain at present and to be growing twice as fast. In the past four years its petrochemicals industry has seen its growth rate increase fourfold.

Until now, U.K. chemical producers have been taking full advantage of this growth, but obviously as the C.M. tariff wall builds up exporting from this country will become increasingly difficult. In 1959, I.C.I.'s export sales to the 'Six' rose from £8.8 million to £11 million; when the 1960 figures are available they should top £13 million. For all U.K. chemicals exports, the E.E.C. showed the biggest market expansion in 1960 taking £55.4 million worth of our chemicals, a rise of more than 20% on 1959. Exports to the E.F.T.A. area last year rose by 14.6% and to the Commonwealth by 4.6%, while the overall increase in U.K. world exports was one of 8.7%.

Price's are U.K. Agents for Oleochemicals Made by Unilever-Emery

A NEW range of fat-derived chemicals not previously produced in Europe are now available from Price's (Bromborough) Ltd., Bromborough Pool, New Ferry, near Birkenhead. From 1 March, Price's have become sole agents and distributors in the U.K. for the oleochemicals obtained from the dimerisation and ozonisation processes operated by Unilever-Emery N.V. in the Netherlands.

Set-up in 1959 as a joint venture by Unilever N.V., Rotterdam, and Emery Industries Inc., Cincinnati, Unilever-Emery have built plant for the production of these chemicals. The products will be exhibited in London at the technical exhibition next week of the Oil and Colour Chemists' Association.

First group of products now on stream is the dimer acids—to be marketed by Price's, one of the Unilever Ltd. Chemical Group, under Emery's Empol trade mark. These dimer acids are of interest for the production of polyamides, rigid and flexible polyurethane foams and coatings, and many other applications including the production of hydraulic fluids, insecticides, corrosion inhibitors, plasticisers, synthetic lube oils and greases, alkyd resins, drying oil varnishes and epoxy resins.

Also available are the products of the Emery ozonisation plant. Azelaic acid (Emerox 1110) is of particular interest in the production of dialkyl azelates and polyesters, as flow temperature p.v.c. plasticisers, and esters for synthetic lube oils and greases. It is also used in the manufacture of polyamides, alkyd resins and polyurethanes.

Pelargonic acid (Emfac 1202) is mainly of value in the production of alkyd resins (plasticising short oil alkyds and baking short oil alkyds), esters as plasticisers and synthetic lubricants and p.v.c. stabilisers. Other uses include the production of soaps and detergents and in ore flotation.

New Pilot Plant for I.C.I. at Billingham

A GENERAL-PURPOSE pilot plant, for rapid production of tonnage batches of development products, is being erected by I.C.I. Heavy Organic Chemicals Division at Billingham, Co. Durham. Due for completion in late 1962 the new plant, together with existing special pilot plants, will be capable of manufacturing the majority of chemicals which are planned for development in the next few years.

Equipment will be provided for carrying out such reactions as alkylation, amination and condensation over a range of temperatures and pressures, with auxiliary equipment for the washing, filtration, crystallisation, drying, distillation, etc., of reaction products.

Products on the development programme of Heavy Organic Chemicals Division which are already available in trial quantities include propylene derivatives, organic acids, alkylated phenols, alcohols and antioxidants.

Fluid Mixers for Australian Rubber Firm

Fluid mixers to the value of £30,000 have been supplied by Lightnin Mixers Ltd., Poynton, Ches, for use in the new plant of the Australian Synthetic Rubber.

Project News

I.C.I. to Boost P.V.C. Output By 43% to Meet Rising Demand

TO meet booming demand for p.v.c., **I.C.I. Plastics Division** is to raise capacity at Hillhouse Works, near Blackpool—currently being increased from 70,000 to 80,000 tons/year—by more than 40% to a total 115,000 tons/year. The new plant is being erected by I.C.I.'s own engineering staff and is due on stream by early 1963.

By the middle of this year I.C.I. should have completed expansion of their Hillhouse plant from 70,000 to 80,000 tons/year; this is also being engineered by the company. I.C.I. are also this month supervising completion and commissioning of Argentina's first p.v.c. plant, for the associated company, Electrochlor. Péchiney of France have plans, too, for entering the p.v.c. field in the Argentine.

The new plant will be capable of extension to meet the "most optimistic market needs of the future". During the last 10 years U.K. demand for vinyl materials rose nearly tenfold to an end-1960 level of 110,000 tons/year. By the end of this year, it is thought U.K. demand could well have expanded by some 25% to a total of around 135,000 tons/year.

To cope with this rapidly expanding demand the only other U.K. p.v.c. producer—British Geon Ltd., jointly owned by the Distillers Company and B. F. Goodrich-Chemical Co., U.S.—are currently raising their capacity, estimated at about 35,000 tons/year. On completion of a £2 million expansion plan in the second half of this year, British Geon will embark on a further major expansion project, the ninth since they started production at Barry, Glam.

By the end of 1961, U.K. capacity is expected to be in the region of about 130,000 tons/year, or about 5,000 tons short of U.K. consumption. Exports of p.v.c. last year, at 35,972 tons, were only slightly ahead of imports, which totalled 35,677 tons. While exports showed a rise of only 14.6% (from 31,373 tons in 1959), imports were higher by 109% (from 16,977 tons).

I.C.I. have made important contributions to the advancement of p.v.c. as a major plastics material and these have made possible the lowering of prices and the widening of the range of materials available. The general pattern of large tonnage applications for p.v.c. has remained unaltered in the last few years. Unsupported calendered sheet and cable still account for the largest tonnage. Then follows supported sheet (leathercloth) and the general extrusions, including piping for water mains and effluent disposal and also rain water goods. In addition to these heavy tonnage uses there are several hundred other applications and new ones are being developed as a result of close collaboration between I.C.I. and project engineers in various industries.

Foster Wheeler Get UCC Licence for Fluid Bed Phthalic

● FLUIDISED bed phthalic anhydride process of **United Coke and Chemicals Co. Ltd.**, a subsidiary of the United Steel Companies Ltd., has been licensed to **Foster Wheeler Ltd.**, London and New York. Production of the new fluid bed catalyst has been licensed to the Davison Chemical Company, Baltimore.

United Coke and Chemicals were the first company in Europe to build a fluidised catalyst bed phthalic plant and many improvements have been made to the plant since then. A working model of it is being shown by U.C.C. on their stand at the Oil and Colour Chemists' Association technical exhibition in London next week (see also page 363) together with a new catalyst developed by the company and samples of naphthalene feedstock, crude product and refined phthalic anhydride.

British Celanese Ltd., former producers of phthalic, are currently experimenting with a fluid bed process licensed from the Coal Tar Research Association.

Big Output Increase for I.C.I. Alkylamines

● LARGE-SCALE capacity increases are planned for alkylamines at Billingham by **I.C.I. Heavy Organic Chemicals Division.** A completely new methylamines plant will be built with capacity more than five times up on the present figure. Currently two plants are producing mono-, di-, and tri-methylamines and one plant for mono-, di-, and tri-ethylamines —with a combined capacity is between 2,000 and 3,000 tons/year. The new plant, due for completion in 1963, will be one of the world's largest and will enable I.C.I. to satisfy the rapidly expanding U.K. market and to raise exports.

Ethylamines capacity is to be increased by more than double by the end of 1961.

Celanese Have First U.K. Peracetic-from-Petroleum

● THE first U.K. facility for the production of peracetic acid from a petroleum source is at Spondon for **British Celanese Ltd.**, who are developing a range of epoxy compounds and resins using peracetic as the epoxidation agent. These will be shown at the O.C.C.A. exhibition in London next week (see page 363).

Revertex Latex Plant

● SITE of the synthetic latex plant planned by **Revertex Ltd.** in conjunction with **International Latex Corporation**, Dover, Delaware, will be on 60 acres at Stallinborough on the Humber Bank (see also 'Project News' last week).

50% Expansion for Chemstrand Acrylic Fibre Plant

● CHEMSTRAND LTD. have announced their intention to expand by 50% to 15 million lb./year, their plant capacity for the manufacture of Acrilan acrylic fibre at Coleraine, Northern Ireland. This is the first phase of expansion and will be completed by mid-autumn of this year. Contractors for the project have not yet been announced. Engineering design work has also been started to increase capacity to 25 million lb./year by the end of 1962.

The original factory, for which Constructors John Brown Ltd. were responsible for the design, engineering and pro-

(Continued on page 361)

First Orders Placed for U.K. Use of N.W.G.B.-Clayton Stretford Process

FIRST orders for the construction of plant in the U.K. to operate the Stretford liquid purification process have now been received. Three have been received by **W. C. Holmes and Co. Ltd.**, Turnbridge, Huddersfield, for the South Western Gas Board, an existing Manchester plant is to be converted, while two firms outside the gas industry, Courtaulds Ltd. and Midland Tar Distillers Ltd., are to have new plant.

The fourth order has been received by **Humphreys and Glasgow Ltd.**, London, from Transparent Paper Ltd., who are to use the Stretford process for an experimental period in one of their processes.

As stated last week, **R. and J. Dempster Ltd.** are the first of the six chemical engineering firms licensed to exploit the process to secure an order from overseas. In competition with German, French and Belgian firms they are to build a Stretford plant in Antwerp with a throughput of 10.7 million cu. ft. of refinery gas; completion is scheduled for December 1961.

The Stretford process was jointly developed by scientists of the **North Western Gas Board** and the **Clayton Aniline Co. Ltd.** In addition to these orders 65 inquiries have been received for plant, coming from the U.S., Canada, Australia, France, Holland, Belgium, Switzerland, Denmark, Norway, Finland, Czechoslovakia, Germany, China and Japan. In addition to the licensees mentioned, **Newton Chambers and Co. Ltd.**, **Simon-Carves Ltd.** and **Woodall-Duckham Construction Co. Ltd.** also hold licences to exploit the Stretford process.

★ AEROSOL production has risen rapidly over the past year but not quite as rapidly as readers of CHEMICAL AGE might have been led to suppose. In the 28 January issue the 1960 figure was given as 25 million units; this was corrected to 40 million units in the 18 February edition, an estimate of the British Aerosol Manufacturers' Association. Now a recent edition of *Aerosol World* states that sales (and by this Mr. G. F. Keen, marketing director of Durazone-Choice Products says he means the number of cans filled) were 50 million units, a level which was forecast by Mr. Keen earlier. There seems to be some doubt among aerosol manufacturers as to which is actually the correct estimate, but whatever the true figure, my readers would agree that to double production in a little over a month would be beyond their wildest dreams.

While on the subject of aerosols, I note that there are some worried firms in the U.S. Some aerosol and cosmetic firms received a jolt when a U.S. district court upheld a patent owned by La Maur Inc. covering the use of polyvinyl pyrrolidone in aerosol hairsprays. Until now the industry has disregarded La Maur's contention that this patent entitles them to royalties. Chief defendant in the case was G. Barr and Co., aerosol fillers. This case was the first real test of the validity of La Maur's patent, and, for the time being anyway, the decision of the court puts La Maur in a good position to demand substantial sums.

★ CORONARY thrombosis is a deadly killer that strikes even the apparently hale and hearty, and it is reassuring to learn that research on this disease, using radioactively 'marked' Chlorella compounds, is making some progress. The U.K.A.E.A. Radiochemical Centre at Amersham have solved the problem of producing Chlorella compounds suitable for radioactive tracing; they grow Chlorella under closely controlled sterile conditions in an atmosphere of radioactive carbon dioxide. Growing a £5,000 batch of radioactive Chlorella takes one or two weeks, but separation of the individual organic compounds takes two or three months—too long in view of the heavy world demand. Amersham is striving to simplify the growing process and turn it into a routine laboratory job.

Separation was previously carried out using high pressure (2,500-3,000 p.s.i.), the 'soup' then being allowed to leak slowly through a needle valve. This proved inconvenient with such small amounts—a batch of Chlorella would be about 10 c.c.—so it is now done by ultrasonics. Centrifuging and freeze-drying follow, final separation being achieved by paper chromatography.

Where does thrombosis come in? Radioactively marked unsaturated acids produced from Chlorella are used to explore the theory that this heart trouble springs from large quantities of saturated fatty acids in the body. Antibiotics research also benefits because a number of amino-acids are available from the radioactive Chlorella farm.

★ THE much publicised 'bulge' of school-leavers, which during the next few years will pass out from the schools into industry and commerce, means that many more intelligent school-leavers are available for recruitment and the chemical industry intends to take advantage of the 'bulge'.

The recent schoolmasters' convention (CHEMICAL AGE, 7 January, p. 7), at which several of the leading chemical companies acted as hosts, was intended to establish contact between the firms and the careers masters' of the public schools in order that schoolboys should be made aware of the number of opportunities existing in the industry.

Another indication that the chemical industry is alive to the potentialities of the 'bulge' is that the number of chemical firms giving their recruitment requirements in the 1961 Directory of Opportunities for School Leavers (published by Cornmarket Press Ltd., at 8s 6d) is nearly double the number listed in 1960 compared with an increase of 32% in the total number of entries. Among these are all the well-known names in the U.K. chemical industry.

★ COULD not the resources of the modern technology be used to design chemical plants, such as those for nitrogen fixation, which are economically suitable for an under-developed country, short of capital but with abundant labour? Such is the question asked by Professor P. M. S. Blackett in the tenth Hinchley Memorial Lecture to the Institution of Chemical Engineers on the subject of science and technology and the developing countries.

Dealing with the great need of under-developed countries such as India for large amounts of fertilisers and the plants to produce them, Blackett points out that in the affluent West the cheapness of capital and the dearness of labour lead to very large plants, the capital outlay for which is far beyond the means of the poorer countries. He puts forward three hypothetical plants: a large plant of a similar size to one a developed country would need but designed to reduce capital cost to a minimum, but one which would use more labour; secondly, a small plant of a type suitable for an advanced country, that is, with a high capital cost; and thirdly, a smaller plant with the lowest possible capital cost.

Blackett admits that what he suggests may be impracticable but, as he points out, some detailed technological-economic studies of such hypothetical plants may be rewarding, particularly in view of the fact that Africa and Asia will in the future show increasing economic importance.

★ A TIGHTENING up of regulations on effluent disposal is imminent in Federal Germany. At the Geneva international meeting on water contamination (22 February to 3 March), delegates heard a report by the German Government outlining the proposed regulations.

It will be illegal to feed untreated waste liquors into watercourses; no industrial waste will be acceptable if it contains dangerous quantities of dirt, sludge or toxic material. Municipal authorities will have to undertake full, not partial, cleansing of sewage, none of which will be allowed if it contains pathogenic agents in dangerous concentrations.

Sewage from factories and local authorities will no longer be allowed to contain oil, inflammable liquids or any other harmful aterials such as detergents in dangerous concentrations. All of this will mean a heavy bill for German industry in the way of additional effluent treatment installations.

★ A CONSIDERABLE achievement is represented by the successful production by Coalite and Chemical Products of m-tert butyl phenol. Substitution in the meta position, a very difficult procedure, is effected by a new technique worked out by Coalite.

As stated last week (p. 320) the chemical has never been produced on a commercial scale before. Although at present the specific use of m-tert butyl phenol in industry cannot be assessed without further development, it is thought that it might be used as an antioxidant for the inhibition of oxidation in rubber, oils and resins, etc. It may also be effective in preventing the formation of skin on paints.

★ AT last I.C.I. have silenced their critics—including me—by announcing plans to start production on a massive scale in the Common Market. Although U.S. and European competitors have the edge on I.C.I. with existing facilities and those already under construction, the new project is so vast that it should more than make up for the delay. No news about products is yet available—although speculation is rife.

This is a big week for I.C.I., with plans also announced for boosting p.v.c. capacity by more than 40% with the opening of the new polyester film plant in Scotland, with plans released for a big hoist in alkylamines capacity and the new pliot plants for Billingham Division.

Alembic

PETROCHEMICALS

Organic Chemicals Show Most Dynamic Growth Rate of Any U.K. Industry

THE organic chemical industry in the U.K. together with the industries converting organic chemicals into end products such as plastics, synthetic rubber, detergents, etc., show the most dynamic growth of any major manufacturing industry in Britain. This was stated by Mr. Harold P. Hodge, B.Sc., A.F.Inst.Pet., A.I.Inf.Sc., of Esso Export Corporation, New York, and manager of chemical market surveys, Esso Petroleum Co. Ltd., in a paper entitled 'The heavy organic chemical industry in the U.K.', which he presented at the national meeting of the American Institute of Chemical Engineers held in New Orleans, La., from 26 February to 1 March.

Over the 10-year period from 1949 to 1959, the output of organic chemicals has increased 280%, i.e. a growth of 11% per year. During this period the average growth rate for all chemicals in the U.K. was 7% a year, against 15% a year for plastics and 37% for chemicals from petroleum. This is compared with average annual growth rates of 6% for the production of motor vehicles and a little over 3% for all manufacturing industries.

Output of Organics

Table 1 shows estimates of the total output of organic chemicals and the source of the raw material for their production. Much of the growth in output of the last 10 years has resulted from the very large increase in production of petrochemicals, such that petroleum's share as a raw material for organic chemical production has risen from 9% in 1949 to 47% in 1959 and is forecast to rise to 65% by 1962.

It is very largely due to the rapid growth and the wide diversification of Britain's expanding petrochemical industry that the chemical industry is now in a strong position and is able to satisfy almost all domestic requirements for organic chemicals and provide a large and thriving export market. A large proportion of the paper, therefore, dealt with the contribution of petrochemicals to the U.K. organic chemicals industry.

A necessary factor in the industry's rapid growth has been the large expenditure of capital on new plants and equipment. The chemical industry as a whole (i.e. both organic and inorganic) spent almost $3,000 million between 1949 and 1959 and out of this $350 million went on new petrochemical manufacturing plants, which in many cases were to produce products not previously manufactured in Britain. Petrochemical investment has, therefore, been at a rate of about $40 million per year over the last seven years (Table 2) and will total nearly $400 million by the end of 1960 and over $550 million by 1962, when a large number of additional plants and expansions will be on stream.

The rapid increase in output of petrochemicals resulting from these expansions is shown in Table 2, which includes figures on the production of inorganic chemicals from petroleum, i.e. sulphur, ammonia and carbon black. Petroleum feedstock requirements to produce these quantities have increased from about 500,000 tonnes in 1953 to about 2.4 million tonnes in 1960 and are forecast to rise well over 4 million tonnes by end-1962.

Products. Products which have contributed very largely to the rapid expansion in organic chemicals output are ethylene, propylene, butadiene, polyethylene, synthetic rubber, styrene, benzene, synthetic detergents and man-made fibres, many of which were not produced at all or only produced in small quantities 10 years ago.

The charts which follow illustrate the growth in output of many of the large volume organic chemicals and include some projections of estimated output in the future.

The first shows that ethylene production has grown from around 40,000 tonnes in 1950 to over five times that quantity in 1959. Total ethylene plant capacity at the beginning of 1960 totalled 300,000 tonnes. Polyethylene, which represents the major outlet for ethylene, accounted for over 90,000 tonnes of ethylene in 1959 or about 45% of the total production. The total output of ethanol has not changed a great deal although the proportion of ethanol produced synthetically from ethylene has increased rapidly, with a corresponding decline in fermentation alcohol. Actually this represents a complete reversal of an earlier practice in the 1950's when fermentation ethanol was catalytically dehydrated to ethylene for polyethylene production, prior to the erection of the large oil cracking units by the major chemical and oil companies.

Another chart compares the growth in output of styrene and chemical grade benzene. All the benzene comes from coal tar distillation which still appears to be adequate to meet requirements in the immediate future by reducing the produc- of motor benzol, thus making available more feed for distillation to chemical grade benzene. A rapidly growing phenol market has led to a sharp increase in the production of synthetic phenol with

TABLE I

Production of Organic Chemicals in U.K.

'000 *Tonnes*

Source	1949	1953	1955	1959	1962
Coal tar	175	230	275	365	540
Acetylene (carbide)	70	80	110	135	150
Synthesis gas (coke)	55	70	80	95	90
Fermentation	160	170	140	80	30
Petroleum	45	195	290	595	1,400
TOTAL	505	745	895	1,270	2,210

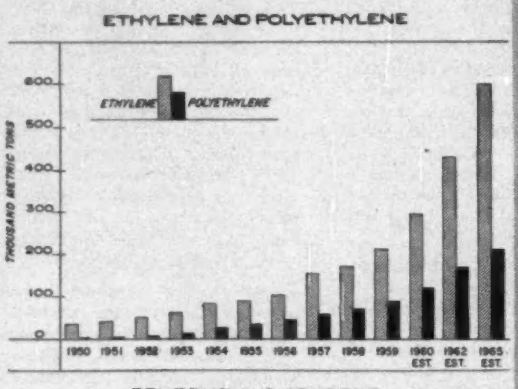
TABLE II

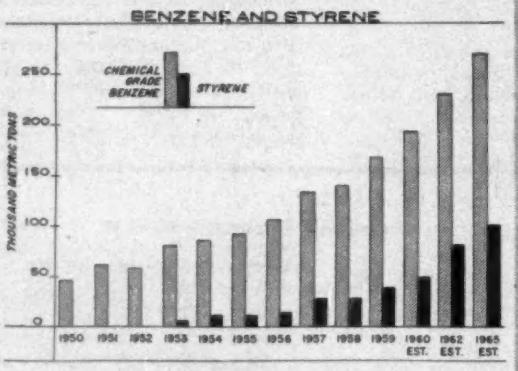
Production of Chemicals from Petroleum in the U.K.

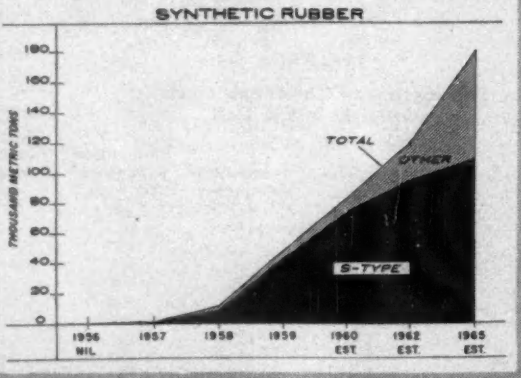
	Organics '000 *Tonnes*	Inorganics* '000 *Tonnes*	Petroleum Feedstock '000 *Tonnes*	Total (†) Investment at Year-end $ *Million*
1950	45	15	160	NA
1951	90	27	300	NA
1952	150	36	500	NA
1953	195	60	660	113
1954	250	75	800	122
1955	290	90	900	125
1956	330	110	970	170
1957	435	130	1,280	212
1958	475	160	1,490	265
1959	595	245	1,850	347
1960‡	750	295	2,350	395
1962‡	1,400	300	4,290	553

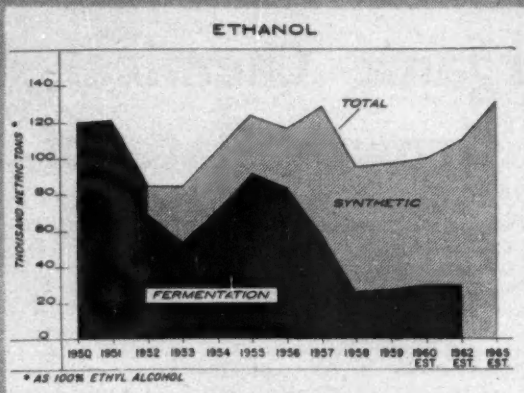
* Carbon black, ammonia and sulphur † Organic chemicals only ‡ Estimated

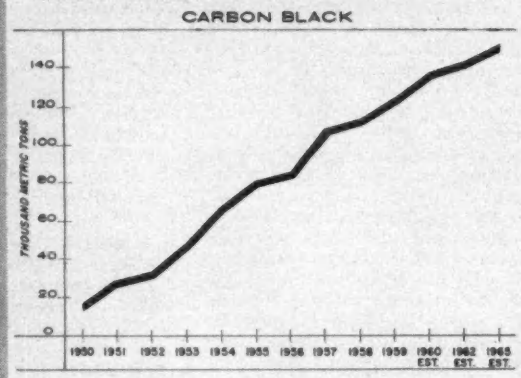
U.K. Production of Petrochemicals, Plastics and Man-made Fibres

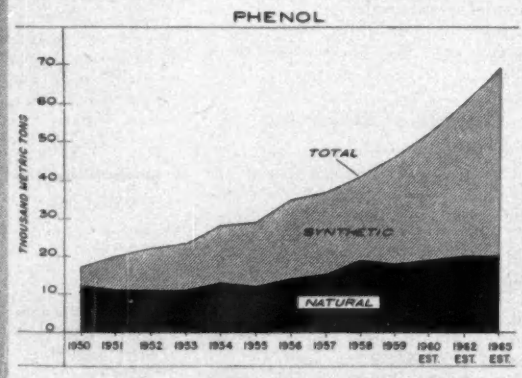


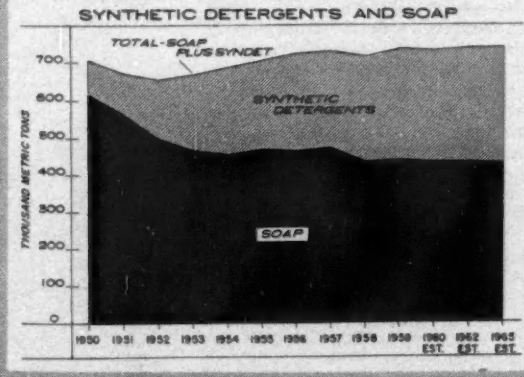












natural phenol remaining static.

The synthetic detergent market has grown steadily in Britain at the expense of the soap market, although the proportion of the total detergent market which synthetic detergents have achieved seems to be levelling off at around 40% compared with the very much higher figure in the U.S. of 75%.

Synthetic rubber manufacture did not commence on a commercial scale in the U.K. until 1958 but is now making rapid progress as another chart shows. The estimated 1960 production of 83,000 tons will represent mainly S-type rubber. By the mid-1960's all types of synthetic rubber, including butyl, N-type and polydiene rubbers, will be in large-scale production.

Unlike the general depression in the textile industry as a whole, the non-cellulosic synthetic fibres industry has shown dynamic growth. Nylon represented the main synthetic fibre until 1955 when Terylene (polyester fibre) output began to increase steadily. Acrylic fibres have been slower to make an impact although two large plants have come on stream this year and will contribute significantly to the future production. The increase in output from 4,500 tons in 1950 to an estimated 49,000 tons in 1960 is a clear indication of the progress which has been achieved.

Plastics production has shown a high growth rate with the most dramatic growth in the thermoplastics, such as polyvinyl chloride, polyethylene and polystyrene, and this rapid increase shows no sign of abating in the future.

Finally, carbon black production almost all of which is furnace black using a petroleum feedstock, has grown from about 25,000 tons in 1950 to 122,000 tons a year in 1959, cutting out the majority of imports and providing a substantial export market.

(Second part of this paper, to be summarised next week, will deal with plants and products.)

ETHYLENE

Producers: B. H. C., Courtaulds, Esso, I.C.I., Shell

Process	Capacity—1960 Tonnes
Steam cracking—naphtha (Kellogg type)	370,000
Steam cracking—refinery gas (Badger)	25,000
TOTAL	395,000

BUTADIENE

Producers: Esso, B.H.C., I.C.I.

Process	Capacity—1960 Tonnes
Butylene dehydrogenation (Esso Research)	42,000
Naphtha cracking and extraction (Phillips and Esso Research)	24,000
TOTAL	66,000

ETHYLENE OXIDE, GLYCOL

Producers: I.C.I., Shell, Union Carbide

Process	Capacity —1960 Tonnes
Direct oxidation (S.D. or Shell)	45,000
Chlorhydrin	28,000
TOTAL	73,000

SYNTHETIC PHENOL

Producers: B.H.C., I.C.I., Monsanto

Process	Capacity —1960 Tonnes
Cumene	13,000
Chlorobenzene	15,000
Sulphonate	10,000
TOTAL	38,000

POLYETHYLENE

Producers: B.H.C., I.C.I., Monsanto, Shell, Union Carbide

Process	Capacity —1960 Tonnes
High pressure (I.C.I.)	127,000
High pressure (B.A.S.F.)	15,000
Low pressure (Ziegler)	15,000*
Low pressure (Phillips)	11,000
TOTAL	168,000

* Used also for polypropylene production.

DODECYL BENZENE

Producers: Grange Chemicals, Monsanto, Shell

Process	Capacity —1960 Tonnes
HF Alkylation (California Research)	15,000
$AlCl_3$ Alkylation	16,000
HF Alkylation (Shell)	30,000
TOTAL	61,000

PROJECT NEWS

(Continued from page 357)

curement, started operating in 1958 on a 70-acre site. The factory now covers 90 acres and a further 98 acres adjoining the site are being purchased.

Chemstrand say the reason for the expansion is the increasing demand for Acrilan in the textile industries at home and overseas. Major markets are in knitwear, carpets, blankets, clothing, etc. In 1960, in addition to supplying the U.K. market with Acrilan, Chemstrand built up a substantial export business.

Chemstrand Ltd. are a wholly owned subsidiary of the Chemstrand Corporation, New York.

Borax Plant Should Be Completed By May

● CONSTRUCTION of additional plant to extend boric acid production at Belvedere, Kent, is now well under way by **Borax Consolidated Ltd.** and should be completed by May.

A programme at the Dunkirk refinery —in hand by **Borax Francais S.A.**—is now under construction at a total investment of about £1 million.

I.C.I. Open Melinex Plant At Dumfries

● MR. J. C. SWALLOW, chairman of **I.C.I. Plastics Division,** on Thursday opened the new Dumfries plant for Melinex polyester film, which has a capacity of 2,000 tons or more a year. By the end of this year, the pilot plant at Welwyn Garden City—opened in 1954—will be closed down. Production at Dumfries will cut out the need for imports from the U.S. and Europe. Main uses for Melinex are seen in electronics, for lining pipes for liquefied gases and corrosive chemicals, in drawing board materials, and in textiles when metallised with aluminium. A big potential is seen in packaging.

Liquid Hydrogen Helium Plant

● NEW plant for producing liquid hydrogen and/or liquid helium is now in service at the **British Oxygen** Scientific Division, Morden, Surrey. It will help the division to meet rising demand from industry and research bodies for the two liquefied gases. The U.K.'s first commercially operated liquid hydrogen plant began operating at Morden in April 1960 and the first helium plant in August.

New Research Block for I.C.I. General Chemicals

New research laboratories are to be built by I.C.I. General Chemicals Division at Runcorn Heath, site of the new divisional headquarters. This will replace the existing research and technical service buildings at Widnes, which will be used for pilot plant production. The engineering and technical department offices have already been set up at Runcorn Heath.

Danish Director Stresses Unique Importance of Fertilisers at Society's Memorial Dinner

FERTILISERS are the only means mankind possess to maintain or increase productivity of the soil. Regarded in this light, the importance of fertilisers is obvious, and 'The importance of fertilisers' was the title chosen by Mr. H. Stevenius-Nielsen for the second Francis New Memorial Lecture delivered to the Fertiliser Society on 23 February at Burlington House, London W.1.

The Francis New Memorial Lectures are given every two years to commemorate the late Dr. Francis New, O.B.E., who was the society's secretary from its start in 1947 until his death in 1957. The second lecturer, Mr. Stevenius-Nielsen, is managing director of the Danish Sulphuric Acid and Superphosphate Works Ltd. and president of the International Superphosphate Manufacturers' Association, among his many other qualifications. He has also been the president of the Association of Chemical Industries in Denmark and of the Federation of Danish Industries.

The biennial lecture is marked by the presentation of an engraved medallion to the lecturer. On this occasion the presentation was made by Dr. H. L. Richardson, president of the society, at a dinner held the same evening.

Mr. Stevenius-Nielsen started his lecture by pointing out a fact which, although well-known is often forgotten, that it is impossible to run farming without a loss of nutrients, and experiments have shown, borne out by experience, that if the loss of plant nutrients has to be replaced by the natural supply only; the result is low yields, inadequate for the demands of modern farming. To maintain the productivity on a high level, a supply of plant nutrients not devised from the soil is absolutely necessary and hence the unique importance of fertilisers.

Some people regard the use of fertilisers as a vice, contrary to nature, but those who hold this view overlook the fact that fertilisers are chemical compounds to which the plant nutrients in farmyard manure, compost and other materials, approved by them as fertilising agents, have to be transformed before they can be assimilated by the plants.

It is true that it is possible by means of fertilisers to reduce the quality and depreciate the feeding value of crops, but the cause is not fertilisers as such, but an unwise use of fertilisers. An example that may be given is the production of grass tetanus by an unbalanced use of potash fertilisers on pastures.

Since it is often necessary to supply crops, not only with the three main nutrients, but also with secondary nutrients—such as sulphur, magnesium and the trace elements—farmers interests have turned more and more to compound fertilisers. While not intending to disparage the use of compound fertilisers, Mr. Stevenius-Nielsen did point out the disadvantages involved in their use. In compound fertilisers, the ratio between the nutrients contained in the fertiliser is a fixed one. A rational fertilisation implies however that the ratio between the plant nutrients is adapted to the need of the crop and the deficiencies of the soil. It will only be profitable for a farmer to buy a compound fertiliser containing more phosphate, for example, than he needs, so long as the unnecessary expense is counterbalanced by the saving obtained by not having to prepare the correct mixture himself.

It is evident that producing a compound fertiliser containing an ingredient that is not always needed (trace elements) or containing more or less of a nutrient than is ordinarily wanted is neither in the interests of consumers nor producers. It is up to the fertiliser industry to supply agriculture with the necessary plant nutrients, but the interests of the fertiliser industry and of agriculture run parallel. What is benefit for one is profit for the other.

At the end of the lecture, Mr. Stevenius-Nielsen came to what he considered the greatest importance of fertilisers. There is today a deficiency of food in the world. Sooner or later a starving nation will try to get enough to eat, and history teaches that the preferred means of the past was war. Fertilisers are means to prevent history repeating itself.

Left to right: Lord Fleck, president of S.C.I., Mr. Stevenius-Nielsen and Dr. Richardson at Fertiliser Society Dinner

Seed-dressings Blamed for Increasing Number of Deaths of Birds

DIELDRIN, endrin, heptachlor and BHC are among the chemicals which are responsible for an increasing number of deaths occurring among birds and other forms of wild life, according to a report issued by the British Trust for Ornithology of the Royal Society for the Protection of Birds and the Game Research Association. The report states that of the 49 birds from the 27 incidents examined by analysts or pathologists, in every case except one there is a prima facie case that the birds were poisoned. In some instances the analysts detected the presence of dieldrin, mercury and chlorinated hydrocarbons.

It is alleged that toxic seed-dressings are the main cause, and, to a lesser extent, sprays. After a meeting held last December at the Ministry of Agriculture, a statement was issued naming aldrin, dieldrin and hepatchlor as ingredients of seed-dressing that can kill animals and birds.

Mr. Condor, an assistant secretary of the Royal Society for the Protection of Birds, was unwilling to say whom he thought was primarily to blame, whether the manufacturers of the dressings or the farmers using more than the recommended dose.

The remedy, thought Mr. Conder, was co-operation and goodwill all round. Manufacturers should make it clear on the labels of packs and in the explanatory leaflets that danger to wild life involved in a particular product. Ultimately the only really satisfactory answer, he said, would be to develop chemicals which were more discriminating in their effect.

A start has been made towards finding a remedy. It was agreed at a recent meeting held at the Ministry of Agriculture that further experimental work will be done. Arrangements have already been made for collaborative experimental work by the Ministry of Agriculture, Fisheries and Food and the Laboratory of the Government Chemist, including an examination of a limited number of bodies of birds and foxes who may have eaten poisoned birds. Collaborative research will continue between the manufacturing companies and the Ministry.

Publicity will be arranged by the Ministry and all parties concerned so as to warn farmers about the risk to wild life.

New Chemicals For Surface Coatings

Many Development Products to be Shown at O.C.C.A. Exhibition

NEW development products and improvements to existing chemicals for the surface coating industries will be featured at the 13th Technical Exhibition of the Oil and Colour Chemists' Association, to be held at the Royal Horticultural Halls, Vincent Square, London S.W.1, from 6 to 9 March. Many of these new developments have been announced since the exhibition catalogue was published; these are summarised in this special CHEMICAL AGE preview of new trends at the exhibition.

Opening times are from 3 p.m. to 7 p.m. on 6 March and from 10 a.m. to 7 p.m. on the other days; admission is free.

Albro Fillers

Their range of filling machines will be shown by **Albro Fillers and Engineering Co. Ltd.,** Ponders End, Middlesex. Exhibits will include a vacuum-operated junior type for filling spirits, dyes and a range of liquids and semi-liquids into bottles; the Albro 3 gravity weight-operated filler for paints, varnishes, oils, etc.; an Albro single head vacuum-operated dustless powder fill machine for filling bottles, tins, plastics containers and drums; and type TC volumetric filler for handling volumetric quantities of free-flowing liquids. **(Stand 31).**

Maleic Anhydride

Data on the dibasic acid, maleic anhydride, now in production from a new plant at Belvedere will be available on the stand of **Alchemy Ltd.,** Belvedere, Kent. This versatile acid finds uses in a wide range of resins, from alkyds to ester gums. Other products include a complete range of metallic naphthenates and octoates and as well as tartrates, citrates, phthalates and other specialised materials for resins, such as nitrocellulose, vinyl copolymers and p.v.c. plastisols. For p.v.a. emulsions, a special section will be devoted to reactive esters based on maleic anhydride and fumaric acid.

On the same stand **Burts and Harvey Ltd.,** Southampton, will show polyindene resins now being developed from pilot plant production. **(Stand 49).**

Euvinyl Pigments

In an exhibit aimed to provide solutions to current lacquer industry problems, **Allied Colloids Ltd.,** Richmond, Surrey, will demonstrate how Euvinyl colours, which are pigments predispersed during production in a vinyl state, can be incorporated in organic solvent systems without grinding. These colours are suitable for inks or lacquers based on p.v.c. and are best used by first making up a 30% concentrate in ethyl acetate and toluene or methyl ethyl ketone mixtures.

Other exhibits will include Zapon spirit-soluble dyestuffs which are stable under acid or peroxide-cured systems; Vinoflex MP400, which gives lacquers with excellent resistance to acids and alkalis; paper lacquers based on Suprapal BM, which have no fire risk and can be applied by rubber rollers. **(Stand 38).**

Superfine Zinc Dust

Following several years of experiments on formulations for the production of alkali silicate zinc dust paints, **Amalgamated Oxides (1939) Ltd.,** Dartford, Kent, will feature their use as protective coatings under marine conditions in view of the interest currently being shown in the use of these compounds for protecting tanker holds where corrosive conditions are particularly severe. Other exhibits will include data on the mechanism of the protection afforded by zinc-rich paint to iron and steel. **(Stand 65).**

Sub-micron Disperser

The A.P.V. Company Ltd., Crawley, will present the Manton-Gaulin submicron disperser widely used in the U.S. and elsewhere for the dispersion of organic pigments. A.P.V. are the sole U.K. manufacturers. Essentially a high pressure positive pump with a special valve arrangement similar to an homogeniser, it operates by applying a high shear force to the pigment particles through the liquid medium. It is claimed that a greater colour intensity is obtained with clearer, brighter colours at lower cost and with small space requirements. **(Stand 7).**

Flame-retardant Paints

Main feature of the exhibit of **Associated Lead Manufacturers Ltd.,** 14 Gresham Street, London E.C.2, will be concerned with flame-retardant paints. It will be shown that the use of Timonox (Cookson's white oxide of antimony) in conjunction with a chlorine-containing polymer produces paints which materially decrease the rate of spread of flame over a surface. Specimens will show that the class of a material may be raised in respect of flame-spread by the use of flame retardant paints formulated with Timonox. **(Stand 100).**

Bentone Gellants

A range of uses for Bentone gellants, stressing their ability to produce heavy-duty anti-corrosive systems based on bitumen, coal tar, coal tar-epoxy and coal tar-urethane, epoxy and vinyl, will be shown by **F. W. Berk and Co. Ltd.,** Berk House, Baker Street, London W.1. Formulations and panels will show how with their help thicker coatings can be applied in one application, thereby cutting labour costs. Advantages of using M.50 basic lead silico-chromate and Bena-gel in water-based stoving primers will be demonstrated.

The reasons for the high and consistent linoleic acid content of tall oil fatty acid S102 from Oulu, Osakey-Htio, Finland, will be indicated, with examples of its use in making cheaper and better alkyds and epoxy esters. Sand paints based on CMC from Uddeholms of Sweden will be shown. **(Stand 88).**

Epoxidised Oil

To be shown by **A. Boake, Roberts and Co. Ltd.,** London E.15, are the results obtained using a derivative of an epoxidised oil as an epoxy resin modifier. This material is in the very early stages of development and has so far exhibited interesting results during adhesion tests on glass surfaces. Tests have been carried out on glass cloth laminate, in which the modified epoxy resin is used as a binder.

Samples of acetoglycerides, tough, flexible plastics coatings, which can be used as external plasticisers for polyvinyl acetate, to give protective strippable coatings for use during the storage and transit of certain foodstuffs and other products will also be shown.

On the same stand, **Albright and Wilson (Mfg.) Ltd.** will feature self-extinguishing Hetron polyester resins, Het acid, an intermediate for alkyds and polyesters, and Het anhydride, a curing agent for epoxy resins. **(Stand 24).**

New Resins from Boehm

Resins being shown for the first time by **Fredk. Boehm Ltd.,** 19 Bentinck Street, London W.1, will include Pioneer M.23, a spirit soluble maleic resin with a melting point (B. and R.) of 150°C; Pioneer M.24, a modified maleic type resin with a similar melting point, both for use in inks; Pioneer M.618C and M.640C are modified maleic resins soluble in ammonia solutions and are designed for compounding with waxes and polymer dispersions for the production of dry bright polishes; Pioneer H.R.680a, O.L.700b, and H.R.720, are pure and modified phenolic resins for compounding with neoprene for adhesive manufacture, the latter being intended for heat-resistant adhesives.

Data will be available on two development products: Pioneer Sti.352, linseed penta alkyd 100% (80% oil-based)—for use in printing inks—and Pioneer Sti. 322/12, a hard-drying alkyd. **(Stand 91).**

Urea Epoxy Condensates

Further experimental work with urea epoxy condensates has led to a resin with better stability and flexibility characteristics, state **B.I.P. Chemicals Ltd.,** Oldbury. These additional proper-

ties have been obtained without detracting from the hardness, adhesion, gloss and resin properties. The improved resin is No. *L*.1954. **(Stand 49).**

Oil-based Peracetic Acid

The first U.K. production of peracetic acid from petroleum sources is announced by **British Celanese Ltd.**, Foleshill Road, Coventry. Using this as the epoxidisation agent, a range of epoxy compounds and resins is being developed. It includes resin dCD (dicyclopentadiene dioxide) and resin VCD (vinyl cyclohexene dioxide), epoxy soya bean oil, epoxy tall oil esters; examples of uses will be illustrated as will the production of 2-3° xylene, nitration grade toluene and dicyclopentadiene.

British Celanese will demonstrate extensions to the range of the higher vinyl monomers; these co-monomers are of increasing interest in producing copolymers with properties superior to those of homopolymers. The Celacol and Courlose ranges of MC and SCMC derivatives will be featured. **(Stand 97).**

Developments in Trokene

Main feature of the B.O.C.M. stand will be an exhibit showing recent advances in the manufacture and uses of Trokene, a material which, made from unsaturated fatty acids by a novel process, is unique in providing a paint medium with a structure independent of ester linkages that is capable of drying by oxidation. As a result of further work, it is stated that by increasing still further the versatility of the reaction, and adding to the range of products that can be made on the large scale, many new applications are now of practical interest; some will be illustrated by the **British Oil and Cake Mills Ltd.**, 2 Kingscote Street, London E.C.2. **(Stand 82).**

New Copolymer Emulsion

Results of laboratory work on the newly-developed Vandike 4010 copolymer paint grade emulsion are to be shown by **British Oxygen Chemicals Ltd.**, Bridgewater House, St. James's, London S.W.1. The stand will feature an evaluation programme by British Oxygen's Scientific Division in which the new Vandike 4010 vinyl acetate acrylate copolymer was used as the basic emulsion. **(Stand 68).**

Water-soluble Resin

How do water-soluble stoving primers stand up to use? This question will be answered by **British Resin Products Ltd.**, Devonshire House, Piccadilly, London W.1, who will feature a comprehensive display of the properties of primers based on Epok A.1700 water-soluble resin, under D.E.F. and other tests. Also to be shown will be a demonstration of the improved resistance to dyestuffs, alkalis and fats possessed by certain Epok urea and triazine resins, and a now air-drying polyester resin, giving a 'gloss from the gun' finish. **(Stand 89).**

Dense Nitrocellulose

Main feature of the stand of **BX Plastics Ltd.**, Chingford, London E.4, is nitrocellulose which is already well established in the form of cotton linters. Recently added to the BX range is dense nitrocellulose which will be of particular interest to users with handling or storage problems. Other products include dipentene of exceptionally high quality, technical and refined diterpene, pharmaceutical and technical grades of camphor, and terpene resins. **(Stand 13).**

New Products from Carless

The stand of **Carless Capel & Leonard Ltd.**, London E.9, will feature the improvements made in processing to refine products too meet customers' needs. Although there will be no outstanding feature, one or two new products will be stressed. These will include pseudo cumene of high purity and a new Caromax, No. 18, with a boiling point range of about 160-180°C. **(Stand 25).**

Resin/hardener System

CIBA (A.R.L.) Ltd., Duxford, Cambridge, will show a new resin/hardener system, Araldite GY 250 with hardener HY 830, for the formulation of solvent-free coatings. Main advantage of this system is its ability to cure under conditions of high humidity and at very low temperatures without detriment to the quality and appearance of the coating. It can also be applied to metal and concrete, etc., in films from 0.007 to 0.015 in. thick. Other exhibits will be a range of basic epoxy resins in solid and liquid forms, and Araldite speciality resins. **(Stand 66).**

Merck Magnesium Compounds

To be featured by **Croxton & Garry Ltd.**, Kingston-on-Thames, are magnesium compounds made by Merck & Co. Inc., U.S. These will include Maglite D, magnesium oxide, for use as a thixotropic and depressing agent giving better non-settling, non-sagging, heat stability and non-penetrating properties at low concentrations; Hydro-magna, a 30% water-dispersed paste of magnesium hydroxide of an average particle size of 0.10 microns which, added without further grinding, functions as a buffering agent in p.v.a. systems; and Marincate, magnesium trisilicate, a buffering agent for emulsions paints that slightly reduces viscosity.

Also to be shown are champagne whitings from Pluess-Staufer, Switzerland, plus other Omya extenders. **(Stand 12).**

Pine Products

Under the caption 'pine products for paint making,' **Fatoils Ltd.**, 91-93 Bishopsgate, London E.C.2, will be showing rosin, turpentine, pine oil, dipentine, etc., from various overseas works. A special feature is to be made of Webacid, a high-grade tall oil fatty acid with a low rosin acid content, which is being marketed for Kommanditbolaget Wendt & Co., Perstorp, whose principals are the producers, Garvamnes AB Weibull, Landskrona, Sweden. Present on the stand will be Mr. D. Dahlgren of Wendt & Ing. W. Krohnstad, of Weibull, a leading Scandinavian chemist in this field.

Another feature will be made of Silcar pigment, said to be the hardest pigment at present known; comparison with the hardness of diamond is stated to be 9.5:10. Leicithin and the bleaching earths produced by Norddeutsche Chemisch Fabrik in Harburg, Germany, will also be shown. **(Stand 33).**

New Isocyanate

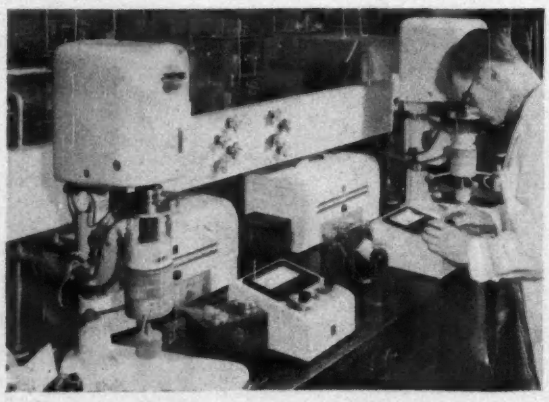
A new Desmodur isocyanate with excellent light fastness and weather resistance will be shown by **Farben Fabriken Bayer AG**, Leverkusen. Development work has led to a new heat drying unsaturated polyester, Roskydel. For use on metallic surfaces; a thicker film can be applied in one operation and adhesion difficulties have been overcome. **(Stand 78).**

Polymer Corp. Licence for Leon Frenkel

Panels of emulsion paints based on homo-, co- and ter-polymers made by the Polymer Corporation of Australia will be shown by **Leon Frenkel Ltd.**, Belvedere, Kent. Leon Frenkel have an agreement to produce these emulsions under licence from Polymer Corporation Pty. They will also show their normal range of alkyd and hard resins, an interesting addition being a tall oil alkyd—Ennelkyd T.628/75/80P. **(Stand 54).**

Ferranti Viscometers

Ferranti-Shirley cone and plate viscometers will be shown by **Ferranti Ltd.**, Hollinwood, Lancs, plus a model with



A Ferranti-Shirley cone and plate viscometer shown in use by a chemist at the Barton installation, Manchester, of Shell Mex & B.P. to determine the viscosity of lubricants

automatic flow curve recorder which enables non-Newtonian flow curves of shear stress against rate of shear to be plotted. This recorder can plot a complete shear stress/rate characteristic in about 10 sec. for most non-Newtonian fluids. Also to be shown is the Ferranti portable viscometer of the coaxial cylinder type for use in laboratories and process control. **(Stand 35).**

New Geigy Products

New products to be exhibited by the **Geigy Company Ltd.,** Rhodes, Middleton, Manchester, will include: Irgalite fast brilliant blue BCS, a new solvent-stable red shade copper phthalocyanine blue; Irgalite geranium RCP, a new calcium 2B toner for general use; Irgalite yellow BGC, a modification of the conventional fugitive type benzidine yellow, designed for gravure inks; Harcure A, a solid anhydride cross-linking agent for epoxy resins; Irgalite multi-purpose stainers—MPS yellow oxide, MPS red oxide, fast green MPS5, MPS extender.

Main theme of the stand will be pigment dispersion, which will be presented under the following headings—good texture, surfactants in dispersion, pigment particle size, particle size distribution, and Geigy pigment dispersions, including those for viscose rayon and distempers, emulsion paints, decorative paints, and polyolefins. **(Stand 57).**

Two New Resins

The introduction of two new resins, Pliolite AC, and Vitel PE200, will be the main feature of the **Goodyear Tyre & Rubber Co. (Great Britain) Ltd.,** Wolverhampton. Pliolite AC is an addition to the range of standard Pliolite resins and because of its long life and durability will find many uses in the exterior field. Vitel PE200, has been developed for solution-coating applications and is a new high molecular weight linear polyester resin. **(Stand 63).**

P.V.C. Metal-coating System

A p.v.c. metal-coating system based on a special primer (Hostalit base concentrate) and a paste polymer (Hostalit PL 1) will be introduced by **Farbwerke Hoechst AG,** who are exhibiting for the first time. This system is said to give coatings on metal with excellent adhesion from low-viscosity plastisols or from organosols. A special particle size distribution means that the polymer needs comparatively little plasticiser, so making harder films feasible.

Hoechst will feature a range of vinyl polymers made including Mowilith resins, polyvinyl acetate, Moviol polyvinyl alcohol, available in different stages of polymerisation and hydrolysis for the stabilisation of emulsions, as a thickening agent, etc., Mowital polyvinyl butyral and polyvinyl formal, Hostalit Cam vinyl acetate/vinyl chloride/maleic acid copolymer, Chlorparaffin 70 solid (a chlorinated paraffin to give flame-retardant paint coats and for water- and chemical-resistant paints). From Kalle AG will come Tylose methyl and carboxy methyl cellulose, while the Dyestuffs Division will feature pigments, spirit and oil-soluble dyestuffs.

U.K. distributors are **Hoechst Chemicals Ltd.,** 50 Jermyn Street, London S.W.1, and for dyestuffs, **Industrial Dyestuffs Ltd.,** 26 Blackfriars Street, Manchester 3. **(Stand 36).**

New Long-oil Alkyd

A new air drying long-oil alkyd, Soalkyd 3029, with excellent colour-retention properties will be shown by **Svenska Oljeslageri Aktiebolaget,** Sweden, representing a further advance in the development of this type of alkyd. Soalkyd 3029 is modified with a fatty acid mixture consisting of linoleic and oleic acids, so designed to keep the linolenic acid content to the absolute minimum in order to control the main cause of after-yellowing. U.K. and Eire distributors are **R. W. Greeff and Co. Ltd.,** 31-45 Gresham Street, London E.C.2. **(Stand 19).**

Metal-organic Chemicals

The main theme of the **Hardman and Holden Ltd.,** Manchester, stand will be new metal-organic chemicals developed since the company exhibited in 1957. Research in the aluminium-organic field has continued and new products in the Manalox range include the oxo-aluminium acylates, Manalox 402, Manalox 403 and Manalox 275, which are all based on fatty acids. Zirconium and calcium acylates, possessing valuable enhanced properties, will be included in an exhibit of the new Manox T type driers now available. **(Stand 70).**

Heat Generators

Hygrotherm Engineering Ltd., 5 Fitzhardinge Street, London W.1, will be showing, by means of a model and full-scale exhibits, the features of their redesigned range of heat generators. These features include increased efficiency, prolonged life of the heat transfer medium and the ability to clean by mechanical methods. The company will also provide details of heat transfer media and developments in mains frequency induction heating. **(Stand 20).**

I.C.I. Development Products

The new Methofas non-ionic, cold water soluble cellulose ethers, to be introduced by the **I.C.I. Nobel Division,** are thickening, dispersing and binding agents and are used as protective colloids, adhesives and water-retaining agents. Nobel will stress the use of Methofas HPM, hydroxypropyl methyl cellulose, in emulsion paints and in methylene chloride based paint removers. Development chemicals will include trimethylol propane, neopentyl glycol and 82% paraformaldehyde flake.

Other I.C.I. exhibits will be: **Dyestuffs Division**—in addition to two new fast phthalocyanine green pigments, two new Supra brand pigments will be shown for the first time, Methasol copying violet O/BS, a spirit-soluble dyestuff for cleaner-to-handle hectograph carbon papers, plus recent developments in synthetic resins and allied products.

General Chemicals Division will feature Alloprene chlorinated rubber, now finding increasing use as a modifying resin which enables synthetic rubber and other adhesives to be adapted for a wide range of uses. **Heavy Organic Chemicals Division** will show aromatic acids of interest to alkyd and polyester resin producers, including isophthalic acid, novel phenolic resin intermediates, adducts of unsaturated C_5 hydrocarbons, and branched-chain carboxylic drier acids, such as nonanoic acid are among the development products. **(Stand 79).**

Isopad Pilot Plant

Isopad Ltd., Boreham Wood, Herts, will show a pilot plant for the production of synthetic resin heated by the Isopad mains frequency induction heating system which is combined with resistance heating. This design provides fast heating-up by induction heating and economic and efficient operation during processing by resistance heating up to any required temperature. Automatic temperature control provides for separate regulation of the heating surface and the liquid by mercury-in-steel contact thermometers. Other examples of Isomantles for process vessels and laboratory use will be shown as well as Isotapes, including additions for operating temperatures up to 650°C (1,200°F). **(Stand 14).**

Filter Aids

Three new products will be introduced by **Johns-Manville Co. Ltd.,** 20 Albert Embankment, London S.E.11, who will also show their Celite range of flatting agents, pigment extenders and filter aids. The new Perlite range of filter aids is said to give low bulk densities and lower prices, while it is claimed that experience has shown that 1 ton will replace up to 1½ tons of diatomite filter-aid.

Calflo T-38 is a new synthetic calcium silicate of high brightness and tests are stated to have shown that as much as 50 lb. of titanium oxide can be replaced by 30 lb. of this product with no loss of opacity. Celite 560 has a flow rate 75% higher than 545, previously the fastest of the Celite filter aids. Celite 560 is of interest to resin producers since it enables filtration at a much more economic flow-rate. **(Stand 75).**

New Alkyd Resin

The recently developed alkyd resin, Setal 1961 WS-60, which is based on 65% of soyabean oil and which is slightly thixotropic, will be featured by **Kunstharsfabriek Synthese N.V.,** Katwijk aan Zeen, Holland, who share a stand with their affiliates, **Remmert-Holland N.V.,** Apeldoorn, pigment producers. Setal 1961 WS-60 is said to be rapid drying, to have good gloss at the usual pigment content and is practically free from haze. Pigment wetting properties are excellent, and brushability is said to be good. Both firms are represented by **F. W. Berk and Co. Ltd.,** 8 Baker Street, London W.1. **(Stand 1).**

New J. M. Products

Johnson, Matthey and Co. Ltd., Hatton Garden, London E.C.1, will feature improved pigments for anti-corrosion finishes. Initial studies have shown that

the metallic pigments have good covering power and give outstanding durability to finishes. It is hoped that samples will be available for ester testing.

To extend the range of cadmium sulphides and sulphoselenides, Johnson, Matthey have concentrated research on the development of new pigments based on cadmium, cobalt and titanium. Also under development are a new highly-stable cobalt-based violet pigment and a new range of green pigments based on cadmium sulphide. The announcement of new pigments, similar to Hatton green and derived from titanate yellow, is anticipated. **(Stand 53).**

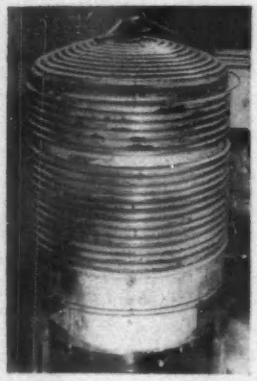
Laporte Titanium

Laporte Titanium Ltd. will stress technical service, illustrating the theme with a number of selected topics on which work has been carried out. These topics will include: flooding and floating in paints; formulation of water-thinned paints based on Runa RH20; water-repellent treatment of masonry based on hydroxy titanium stearate, and the use of titanium nickel yellow in B.S. colours.

On the same stand, **Laporte Chemicals Ltd.** will show a wide range of organic and inorganic peroxygen compounds for initiating polymerisation; latest developments will be featured. **(Stand 69).**

Varnish Kettle

A 1½-ton varnish kettle of advanced design will be shown by **Metal Propellers Ltd.,** 74 Purley Way, Croydon. The method of heating employs an electric/oil system. Heat transfer to the pot is effected through an external spiral coil jacket formed from half-round section tube. This type of jacket offers a positive flow for the heating media and therefore gives an even and consistent temperature distribution. The stiffening effect of the coils is said to permit economies in thickness of the inner vessel shell, particularly attractive where stainless steel is used. Metal Propellers will have up-to-date information on new trends in the distillation field. **(Stand 96).**



2,400-gall Reaction vessel

Vinyl/acrylic Copolymer

A recent addition to the range of vinyl copolymers produced by the Resin Division of **National Adhesives Ltd.,** Slough, Bucks, is a vinyl-acrylic co-polymer that is fully compatible with zinc oxide. Also new is a vinyl acrylate dispersion for use in dry bright floor polishes and linoleum finishes. National Adhesives believe that their research work will show that fire-retardant and intumescent properties can now be allied to conventional emulsion paint performance. Their formulae are based on p.v.a. polymers. **(Stand 21).**

Mineral Extenders

This year **A/S Norwegian Talc,** Bergen, whose U.K. representatives are **H. A. Watson and Co. Ltd.,** 448 Derby House, Exchange Buildings, Liverpool 2, will describe the difference between several types of mineral extenders and their influence on paint properties. Special attention will be given to dispersion and the incorporation of fine and extra white laminar talc qualities. **(Stand 73).**

Tribasic Lead Maleate

A further development of their Lucipal extra (benzoyl peroxide catalyst/amine accelerator compound) which gives improved compatibility with a wider range of polyester resins will be shown by **Novaldel Ltd.,** St. Ann's Crescent, London S.W.18. Also to be featured are some new liquid forms of cyclohexanone peroxide; Cyclonox LM-50 and Cyclonox LTM-50 should interest users who favour cyclohexanone peroxide, but yet need a liquid catalyst. Tribasic lead maleate is another new Novaldel product and its use will be shown as a curing agent/stabiliser for chlorosulphonated polythene (Du Pont's Hypalon) finishes. **(Stand 86).**

Oleochemicals from Holland

Dimer acids, azelaic acid and pelargonic acid—oleochemicals produced from the dimerisation and ozonisation processes operated by Unilever-Emery NV, will be featured by **Price's (Bromborough) Ltd.,** Bromborough Pool, New Ferry, near Birkenhead. Price's have been appointed sole agents and distributors in the U.K. for these Unilever-Emery fat-derived chemicals, which are described on page 356. **(Stand 59).**

Phenolic Resins

The range of resins produced by **Schenectady-Midland Ltd.,** Oldbury, Birmingham, for the paint industry will include pure and modified phenolic resins, a fast-drying alkyd-styrene copolymer, a mineral spirits-soluble alkyd styrene copolymer, and a short-oil pure alkyd of the non-drying type. Also to be shown are printing ink resins, including alkyds, modified phenolics, polyterpenes, polybasic acid rosin ester, and fortified rosin esters. **(Stand 39).**

Paint Research

An exhibit on research into microbiological attack of paint will be shown by the **Paint Research Station,** Teddington, in conjunction with the Tropical Research Fellowship. The bacterial attack on emulsion paint due to the presence of *Aerobacter aerogenes*, resulting in 'gassing' in the can, will be shown. Lime-stain will also be featured; this whitish stain, not of microbiological origin, results from the passage of calcium compounds through films of paints a few weeks after application to fresh cement plaster. Formulation principles to reduce lime-stain without using a sealer include measures to reduce permeability, i.e. use of small particle size emulsions, solvent plasticisers and low pigment-binder ratios and colloid content. The ideal paint would act as a barrier to calcium ions, but not to water molecules. **(Stand 27).**

Shell Resins, Solvents

Main products to be featured by the **Shell Chemical Co. Ltd.,** 15-17 Great Marlborough Street, London W.1, are Epikote resins and solvents of particular interest to producers of anti-corrosive paints and metal finishes. The resins section will include isocyanate-cured Epikote resin / alkanolamine adduct systems, fast-curing Epikote resin/PF systems, Epikote ester emulsions, Epikote resin solventless systems with long pot life and Epikote resin-based putties. To be highlighted is the applicational dexterity of the Shell range of ketones, alcohols, Oxitol and Shellsol solvents; special attention will be paid to recent developments in their use for finishes, including vinyl, acrylic and polyurethane formulations. **(Stand 77).**

Mixer-emulsifiers

Silverson Machines (Sales) Ltd., 55-57 Tower Bridge Road, London S.E.1, will exhibit their range of multi-purpose mixer-emulsifiers. The laboratory mixer which is supplied with a stand will perform the functions of mixing, emulsifying, homogenising, disintegrating, pumping, straining and filtering with smoothness and efficiency. At the other end of the scale machines are built to handle quantities of over 2,000 gall. All results obtained with the laboratory mixer can be accurately reproduced in production by the larger machines and an accurate forecast made of working times, volumes, appearance, texture and properties of the finished article.

A new introduction will be the immersion roller mill, now redesigned with the paint industry in view. **(Stand 23).**

Metallic Lead Primer

Spelthorne Metals Ltd., 38 Berkeley Square, London W.1, will use roof exposure panels to show that a single coat of metallic lead primer applied to a steel panel gave perfect protection against corrosion for a period as long as eight years. Another part of the display will consist of exposure panels, which it is hoped will provide a possible explanation as to why laboratory type corrosion tests fail to correlate with roof exposures. A number of electro-potential curves will demonstrate the value of metallic lead pigment as the main active constituent of paints. **(Stand 32).**

Organotins

As additions to paints organotin compounds find three uses; as anti-fungal agents in emulsion paints, as anti-fouling additives to paints used underwater, and

as stabilisers for chlorinated rubber paints. Each of these three uses will be illustrated by the **Tin Research Institute**, Perivale, Middlesex. For the first use panels will show that mould growth in the untreated paints is profuse, while there is none on paint protected with organotin. Samples coated with paints of the chlorinated rubber type containing organotins and which have been subjected for a long time to conditions which promote their break-down will also be shown. **(Stand 30).**

Acrylate Developments

New products of particular interest in emulsion polymers to be shown by the Chemicals Division of **Union Carbide Ltd.**, 8 Grafton Street, London W.1, are improved higher viscosity grades of Cellosize HEC offering outstanding cold water solubility. Latest developments in acrylate polymer technology will be included and a range of new monomers which will be shortly available for research evaluation will be stressed.

The range of Cellosolve and Carbitol glycol-ether and glycol-ether ester solvents will be displayed; the established uses for this group of versatile solvents will be reviewed. A new high boiling solvent now available is methyl n-amyl ketone. **(Stand 37).**

Naphthalene Developments

Among new developments by **United Coke and Chemicals Co. Ltd.**, Sheffield 13, a United Steel Companies subsidiary, work on naphthalene purification has led to the isolation and identification of two unusual compounds not previously believed to be available. These are 2 : 2′ dinaphthyl and 2 : 2′ naphthyl dionaphthene; both have interesting possibilities as insecticides, extenders, dyestuffs and pharmaceutical intermediates and heat transfer media (particularly in conditions of atomic radiation). They can be fully chlorinated to give high mol. wt. resinous compounds with m.pts. in the 100-140°C range. A further development is the addition of solvent F, which consists mainly of methyl naphthalenes and is virtually free from paraffinic compounds. It is expected to be of interest where high solvent power coupled with slow evaporation rate is sought.

From the new Appleby-Frodingham benzole refinery at Scunthorpe, come benzene, toluene and xylenes of "purites not previously available in bulk from any other U.K. source". The refinery steps do not involve the use of hydrogen and the solvents retain their fully aromatic character. Two lower viscosity modifications of U.C.C.'s special pitch No. 3 for use with liquid or solid epoxy resins have been introduced. Known as special pitch Nos. 4 and 5, they are designed to ease bulk handling, particularly during the winter. **(Stand 22).**

Sand Mills

Vickers-Armstrongs (Engineers) Soap and Paint Division, Broadway, London S.W.1, will show two sand mills, a half gallon unit and No. 3 Mill. The method of dispersion using sand as the grinding medium has aroused wide interest. It is now accepted that adoption of the sand grinding process warrants careful consideration, both when additional milling capacity is needed and when economic considerations involve a review of existing means of production. A ½-gall. sand mill which is used initially for evaluation purposes and a production size unit will be shown. **(Stand 80).**

New Acrylic Copolymers

New from **Vinyl Products Ltd.**, Carshalton, Surrey, will be two acrylic copolymers—Vinacryl 3000 and Vinalak 5 R3075. Vinacryl 3000 has been developed for the production of acrylic stoving finishes which are characterised by short flash-off time, excellent gloss, colour and intercoat adhesion. Vinalak R3075 is a versatile plasticising resin that can be used with melamine formaldehyde resins, either alone or with epoxy resins; if modified with a catalyst it can be used with epoxy resins in acrylic stoving finishes.

Also to be featured are the vinyl acetate:2-ethylhexyl acrylate copolymers of the Vinamul N6800 range. The exhibit demonstrates that these very fine particle copolymer emulsions compare favourably with the costlier all-acrylic emulsions. **(Stand 83).**

Process Control

Theme of the stand of **Younghusband Stephens and Co. Ltd.**, London Road, Barking, will be production control involving the use of the most modern instruments for the analysis of surface coating materials, including chromatography; the process of control depending on rigid observance of the specification given to each product ordered, prior to manufacture.

While there are no new exhibits, the company has improved the range of water soluble oils and media; Soya Plastybcol is now available as a standard product in viscosities up to 500 poises and has created interest in the mastics field. A range of alkali refined oils and low viscosity stand oils of pale colour and low acid value has been produced. **(Stand 64).**

Laboratory Mixers

The 'easy-to-clean' aspects of the 1-qt. stainless steel laboratory twin Z bladed mixing machine of **Winkworth Machinery Ltd.**, 65 High Street, Staines, will be stressed for research into oil and colour mixing problems. Also featured will be laboratory scale models of change jar tumblers for experiments in the field of dry powder and granule blending. **(Stand 87).**

Dimeric Acids

The Dimac S grade of dimeric acids produced by the process of **Victor Wolf Ltd.**, Clayton, Manchester 11, will be featured. This is finding increasing use in the production of alkyds, polyamides, polyesters, polyurethane foams and elastomers. A range of solid and liquid polyamides made from Dimac S will be shown, with Dimac S-based polyesters. Methyl esters of tung oil fatty acids will be shown with typical tung oil-rich alkyds.

Latest additions to the Wolf range are slip agents for use in plastics coatings for paper, Cellophane and similar substrates and for use in plastics films. Two products will be available in development quantities. **(Stand 67).**

Borax Report Record Sales and New Processes Developed

RECORD sales and new development products are referred to by Lord Clitheroe, chairman of Borax (Holdings) Ltd., in his report for the year ended 30 September, 1960. Sales of boron products throughout the world were a record both in tonnage and value, with the greatest progress being made in Europe. The major borate consuming industries—glass, glass-fibre, enamel and sodium perborate—all showed considerable expansion throughout the world, with new plant for glass-fibre, planned and in hand, providing a growing outlet for borates in future years.

Last year was the eighth in succession in which sales of Borax Consolidated grew, with the largest percentage increase ever recorded. The general outlook for their business in the U.K. was good, although possibly not as good as last year. Lord Clitheroe referred to the recent acquisition of Hardman and Holden Ltd. and added that the directors would continue to seek means of broadening the base of the group's activities.

It was expected that the expansion would continue over the years. The group's profits should be maintained in the current year (last year's results were given in CHEMICAL AGE, 4 February, p. 219).

Discussing research, the chairman stated that a process had been developed for the production of titanium diboride for use as an electrode material in the production of aluminium. In the U.S., a new household dry bleach was undergoing tests "with encouraging results". A joint programme with Dow Chemical, started in 1958, had led to the successful development of a process for boron trichloride, a compound important as an intermediate in the production of other boron compounds. Work in new fields of boron chemistry continues, including the search for heat-resistant inorganic polymers.

Booklet on Consolidated Zinc Operations

The story of the Consolidated Zinc Corporation Ltd., who have interests in Australia, U.K. and Canada is outlined in a booklet published recently. The main steps of the development of the Group are described and the possibilities for future growth and diversification are outlined.

Organotin Developments Feature in T.R.I. Report

THROUGH a proper choice of reaction conditions a high yield of industrial important trialkyltin chlorides can be obtained. An investigation into the reaction between stannic chloride and aluminium alkyls has established that, in fact, equilibrium reactions are involved—the transference of alkyl groups from aluminium to tin as well as from tin to aluminium. (*Annual Report 1960*. International Tin Research Council.*) Research on organotin compounds is being carried out at the Organisch Chemisch Instituut T.N.O., Utrecht, Holland, under Professor van der Kerk. Particular attention was paid to the stannic chloride/aluminium alkyl reaction since aluminium alkyls are readily available through the Ziegler process and are, therefore, attractive alkylating agents. It was also found that there is a pronounced effect of alkali halides on the course of the alkylation reactions.

Continued attention is being given to the biocidal properties of organotin compounds. A number of compounds representing new types, including trialkyl- and triaryltin derivatives of N-substituted maleamides and some cycloalkyltin compounds, were tested for antifungal and phytotoxic activity.

Investigation into organotin compounds in heat resistant applications continues. Experiments on the suitability of alkystannonic esters as bases for heat resistant paints have developed favourably.

At the Tin Research Institute laboratories, investigations into the photochemical decomposition of triphenyltin acetate have been continued and the initial mode of breakdown is now known. Further work has been done on the influence of the configuration of the particular organotin compound used as a stabiliser for p.v.c. on its extractability from the p.v.c. in various specified solutions. It has been confirmed that in the absence of plasticiser little or none of the tin compound is extracted.

* *Copies of the report are available to libraries and organisations interested in tin and its applications from Tin Research Institute, Fraser Road, Perivale, Greenford, Middlesex.*

Chemicals and Chemical Plant in U.K.-Czechoslovak Agreement

THE Board of Trade state that agreement has been reached with representatives of the Czechoslovak Ministry of Foreign Trade about quotas for Anglo-Czechoslovak trade in 1961.

The quota lists make provision for Czechoslovak purchases during 1961 of about £5.6 million of U.K. manufactures. The quota lists also provide for the issue of United Kingdom import licences for Czechoslovak goods up to a total of about £8 million. This is additional to the trade in goods which, under U.K. import licensing regulations, can be imported from Czechoslovakia and other countries without a specific import licence.

Czechoslovak goods listed for import into the U.K. include pharmaceutical, fine and laboratory chemicals to a value of £120,000; various unspecified chemicals £150,000; coal tar derivatives (no set value); and p.v.c. pliable sheeting and p.v.c. type leather cloth to a value of £30,000.

U.K. goods for export to Czechoslovakia include chemical plant and equipment to a value of £300,000; tanning material (no set value); phenol £150,000; plastics including p.v.c. £450,000; dyestuffs, paints, inorganic pigments, etc., £125,000; numerous unspecified chemicals £650,000; toilet preparations, aromatic materials and essential oils.

Import Duty Exemptions on Chemicals

THE Treasury have made the Import Duties (Temporary Exemptions) (No. 2) Order, 1961, which revokes from 1 March 1961, the temporary exemption from import duty of the following chemicals:

Description of Goods, 1:1-Dimethoxy-2-phenylethane (tariff heading 29.10); *n*-Decaldehyde; 2-Methyl-*n*-undecaldehyde; *n*-Nonaldehyde; *n*-Octaldehyde; *n*-Undecaldehyde; Undec-10-enaldehyde (tariff heading 29.11); γ-Undecolactone (tariff heading 29.37).

A further effect of the new Order is that, with effect from 1 April 1961, the temporary exemption of cyclohexanone, classified in tariff heading 29.13, is revoked.

Vera—A.E.A.'s Latest Reactor—Goes Critical

VERA (Versatile Experimental Reactor Assembly) a new low-power reactor went critical at the Atomic Weapons Research Establishment, Aldermaston, on 22 February. This unit is being used in reactor physics experiments to improve nuclear data and methods of calculation for fast critical assemblies. More information on these systems is required for many problems relating to the safety of storage and processing of fissile materials and for the fast reactor development programme.

This work forms part of a programme of experimental and theoretical nuclear data studies at A.W.R.E. and is coordinated with fast reactor work in progress at other A.E.A. establishments.

Shell Polyisoprene Now Available in U.K.

DEVELOPMENT quantities of Cariflex isoprene rubber are now available in the U.K. for evaluation purposes, state Shell Chemical Co. Ltd. A stereospecific polymer of isoprene, the product has properties and applications closely similar to those of natural rubber. (Evaluation quantities of Goodrich-Gulf's Ameripol SN polyisoprene have been available from Durham Raw Materials for some time.)

A Shell plant for isoprene rubber is now under construction at Pernis near Rotterdam. Polydiene rubbers are also to be produced by the Shell Chemical Co. at Carrington.

Shell were the first to produce polyisoprene in the U.S. on a commercial scale, their plant at Torrance, Calif., having come on stream in October 1960 with a capacity for 18,000 tons/year. A second plant of double that capacity, built near Marietta, Ohio, is due on stream late this year.

U.S. Metal Finishing Know-how for A. & W.

ALBRIGHT and Wilson have entered into an agreement with Hanson-Van Winkle-Munning of Matawan, New Jersey, U.S.—a long-established company well known in the metal finishing industry—under which Albright will be able to call in the very wide American experience in the design of automatic plants for electro-plating, chemical polishing and anodising. This agreement means a great extension to the existing range of plant which Albright provide to operate their specialist metal finishing processes, notably, Phosbrite chemical polishing solution and Plusbrite addition for nickel and silver plating.

At present, Albright engineers are completing the installation of a very large automatic chemical polishing and anodising plant for a Midlands company.

Rentokil Acquire Makers of Rodine

FOURTH company this year to be acquired by Rentokil Group Ltd., claimed to be Europe's largest organisation in the manufacture and application of pesticides, are Thomas Harley Ltd., makers of Rodine rodenticides, Perth.

The business was founded 61 years ago by the pharmacist Thomas Harley. The firm now produces a rodenticidal paste, Rodine warfarin, a special mouse warfarin and moth-repellent Modines.

Obituary

The death has occurred, at the age of 72, of **Sir Arthur Smout**, the metallurgist and industrialist. From 1924 to 1934, Sir Arthur was production director to the Elliott Group of metal companies which later merged into Imperial Chemical Industries Ltd. He became managing director and later chairman of what is now known as I.C.I. Metals Division. He was appointed to the main board of I.C.I. in 1944.

Overseas News

CELANESE TO BUILD PLANT FOR THEIR NEW, COMPETITIVE ACETAL COPOLYMER

ACETAL copolymer, Celcon, a new Celanese of America product, will compete directly with Delrin, the Du Pont polyformaldehyde, polycarbonates and other polymers classed as engineering plastics (see also C.A., 18 February, page 283, and 25 February, page 330). Celanese are to build a commercial plant at Bishop, Tex., to make Celcon. The plant is expected to be on stream early in 1962 and in the meantime pilot plant quantities will be made at Clarkwood, Tex. The size of the installation is not disclosed, but it is estimated that it will be in the 25 million lb. a year range.

Celcon is produced from trioxane, the trimer of formaldehyde, and, although the company do not reveal the specific composition of the polymer, they stress that it differs from a polyformaldehyde such as Delrin in that it contains certain comonomers which give the material unique properties and structure. They say it is unmatched among thermoplastics for strength over a wide temperature range and for long periods of time.

In immediate application, Celcon is expected to replace metals such as die cast zinc and aluminium, brass, copper and steel. Celanese expect that by 1965 consumption of Celcon will be about 70 million lb. a year, the biggest outlet being in the car industry.

Celanese hold patents for the process in France and Italy and have several pending in the U.S.

Soviet Know-how for Iraq Pharmaceutical Plant

Erection of a pharmaceuticals plant near Samarra, Iraq, is to begin in July. The plant will have an annual production of 5½ tonnes each of penicillin, streptomycin and dihydrostreptomycin. Some 50 Iraqi technicians are to be trained in the Soviet Union for the operation of the plant.

New Drug-chemicals Plant Planned for Sicily

Following an agreement with Cyanamid Italia Compagnia Tecnica Industrie Petroli will build a pharmaceutical chemicals plant in Catania, Sicily.

Allied Chemical Plan New Facilities at Sarnia

Allied Chemical Canada Ltd. will be moving into Canada's chemical valley at Sarnia, Ont., where the company is preparing to take up an option on 180 acres of land. Allied plan no early announcement on plant construction plans or products to be manufactured.

But it is expected this will be the site of the company move into petrochemicals in Canada. The parent company has been expanding rapidly into the organics field in recent years with main emphasis on nylon, polythene, isocyanates, vinyl chloride, resins, plasticisers and agricultural chemicals. Allied Chemical have been active in Canada for some years in acid, calcium, sodium ash, food additives, dyes, etc.

Casein Manufacture by an Improved Process

Casein production, which is on the increase in Australia, has been the subject of research by the Commonwealth Industrial and Scientific Industrial Organisation. The research has been directed towards improving the quality of the product and to the manufacturing process itself.

Casein is usually made by the addition of hydrochloric acid to skim milk when it is formed as a curd. After separation from the whey it is washed to remove impurities and then dried. It is found that the quality of casein produced in one type of plant could be improved by modifying the separation and washing stages. In the modified equipment separation is successfully carried out by running the mixture of casein and whey or water over a stainless steel screen inclined at an angle of 30°.

New equipment has been designed by James Bell Machinery Pty. Ltd. of Melbourne for the acidulation and washing stages of the process.

Two Chemicals for Tariff Enquiry in Australia

The Australian Minister for Trade has referred to the Tariff Board for enquiry and report the question whether assistance should be accorded the production of bisphenol A (2:2—di-(*p*—hydroxyphenyl) propane) and condensation, polycondensation and polyaddition products of the epoxy type, "whether or not modified or polymerised and whether or not linear, including such goods in the form of tubes, rods, sticks, profile shapes or in the form of plates, sheets, strips, film and foil, whether or not printed, embossed or surface worked" (Tariff Items 281 (L) (1) and 369 (C) (4) (b)), sodium silicates (Tariff Item 278 (A) (1)) have also been referred for similar enquiry and report.

New Polythene Technique gives More Long Chains

The U.S. company, Celanese, have developed a "new technique" which gives linear polythene with an unusually high content of long chain molecules. The higher long-chain content results in a resin tougher than conventional linear polythene and better suited to end uses requiring resistance to high pressures and temperatures, impact and stress cracking. Processing speed is the same as for the conventional polythene, and both are priced at 38 cents a lb.

Celanese have expanded the facilities at their Houston plant from 50 million to 60 million lb. a year to produce their new Fortiflex R resin.

Cheaper, Better Syn. Rubber from Methane, says U.S.S.R.

According to recent Russian reports, scientists at Sumgait, Azerbaijan, have invented a method of producing synthetic rubber from natural gas by a single-stage process and on an industrial scale. The butane-based rubber is claimed to be superior to other synthetic types and cheaper by between 25 and 35%. It is believed that this year's Lenin prize will be awarded to the inventors, chemists at the Azerbaijan Academy of Sciences.

Czech Aid for Albanian Chemical Combine

Under an agreement signed between Czechoslovakia and Albania in Tirana this month, Czechoslovakia is to grant Albania credit and technical aid over the period ending 1965 for the building of a chemical combine and for other projects.

Oxygen Expansion for Norwegian Firm

Nordiska Syrgasverken AB, Gothenburg, who are associated with Svenska AB Gasaccumulator, Lidingö, have raised capacity of their Fagersta plant to more than 1,000 cu. m./hour of oxygen. The plant now handles production of both liquid and compressed oxygen.

U.S. Production and Sales of Agricultural Chemicals Up

U.S. production of pesticides and other organic agricultural chemicals reached a total of 637 million lb. in 1960, an increase of 9% over 1959, according to Tariff Commission figures.

Sales of pesticides were valued at $253 million, compared with $225 million in 1959, and, as usual, DDT was the biggest quantity item.

Nylon 6 Plant for Celanese Mexicana

Feldmühle AG, who have gained the contract for building a nylon-6 plant for Celanese Mexicana, have their headquarters in Rorschach, Switzerland, and not Rorschach, Germany, as stated in 'Overseas News', 4 February. Feldmühle are part of the Flick group.

S.B.A. Ammonium Nitrate Plant for Mekog

The Société Belge de L'Azote et des Produits Chimiques du Marly (S.B.A.), Liege, Belgium, has been entrusted by MEKOG (N.V. Maatschappij Tot Exploitatie van Kooksovengassen) with the

engineering of a unit for the neutralisation and concentration, under atmospheric pressure, of ammonium nitrate solutions. This unit, applying S.B.A.'s technique, will be erected at Pernis (Netherlands) and will have a daily capacity of 285 tons of ammonium nitrate 100%.

Ethylbenzene Plant for Suntide Refining

A subsidiary of Sunray Mid-Continent Oil, Suntide Refining, are to build a 30 million lb.-a-year ethylbenzene unit at Corpus Christi, Texas. The unit will use a process developed by Cosden Petroleum and Badger Mfg. Co. which recovers ethylbenzene from a mixed xylene stream. Badger will design, engineer and build the plant which is due on stream early in July.

Second Loan for Israel Potash Expansion

A loan of $10 million has been granted by a consortium of U.S. banks to help finance expansion of the Dead Sea potash works, which will raise potash output to 600,000 tons a year, or five times the present figure. This is in addition to a loan of $25 million that Israel has secured from the World Bank. Shares are to be issued locally to the extent of $27 million.

New Silicate Polymers Show Promising Properties

Although as yet in the early stages of research, new silicate polymers discovered by the U.S. company, Aerojet-General, show 'excellent' resistance to acids, bases and organic solvents. The polymer will withstand temperatures above 600°F for many days and 1,000°F for about an hour. It will also retain elastomeric properties below −100°F, according to Aerojet.

Italy to Set Up Soya Bean Processing Plant

A large plant is being erected at Ancona for processing soya beans as well as for castor beans and other oilseeds. The plant will consist of 16 processing cells, four of which, with aggregate capacity of 200 tonnes a day, will go on stream before the end of the year.

Dwindling Markets Hit Aden's Salt Industry

Production of unrefined solar salt at Aden is expected to end within the next five years because coastal markets in Asia and Africa are developing their own industries. Exports in 1959 totalled 168,505 tons, compared with a 1957 high level of 37,223 tons. Exports in the first half of 1960 totalled 53,702 tons. Only two of the four salt companies are in production—Aden Salt Works and Indo-Aden Co. Combined capacity of the four works is about 400,000 tons a year.

Rumania Plans New Petrochemical Plants

Rumania's petrochemical production capacity is to increase over the next few years to 880,000 annual tonnes, of which some 500,000 tonnes will be based on natural gas and 380,000 tonnes on refinery gas and mineral oil. Stress-point of the country's plans will be in the Onesti-Borzesti area of Rumanian Moldavia. It is there that a chemical complex is now under construction for the processing of mineral oil and salts from Moldavia and natural gas from Transylvania, combined production worth of which is estimated at Lei 2,600,000,000 annually.

A 500,000-tonne catalytic cracker in the refinery, a 30,000-tonne caustic soda plant and a combustion coking works are already in operation at this plant, while work continues on units for the annual production of 36,000 tonnes of p.v.c. and 50,000 tonnes of styrene-butadiene synthetic rubber—the latter to open at the end of this year. Further chemical plants to be opened in the area will produce phenol and acetone (see also C.A., 28 January, p. 181).

Purity of Ethyl Alcohol in Italy

Italian Association of Distillers, pending the likely adoption of a joint alcohol policy in the area of the Common Market, has officially laid down new and stricter specifications for 'extra fine' ethyl alcohol produced in Italy.

From now on the quantity of impurities contained in such alcohol is not to exceed the following limits:

Methyl alcohol	0.05%
Acidity	1.8 mg./100 c.c.
Ethers	10 mg./100 c.c.
Aldehydes	1 mg./100 c.c.
Superior alcohols	2 m.g./100 c.c.
Furfural	nil

The decision is motivated by the fact that most of Italian distillers have been producing for some time alcohol which satisfies the above needs and is of a quality considerably higher than that fixed by the 1957 regulations.

Triphenylphosphorus Available in U.S.

Produced by a modified Grignard synthesis, triphenylphosphorus is now available in commercial quantities from Metal and Thermit, Rahway, N.J. This compound, $(C_6H_5)_3P$, is used in the production of phosphorus and it provides a one-step synthesis of complex olefins. Other uses seen are the direct production of aldehydes, halogenation to triphenylphosphorus diahalide, oxidation to triphenylphosphorus oxide and addition to sulphur to form triphenylphorus sulphide.

Organisation to Cover Dutch Industrial Process Equipment

Stichting Nederlandse Apparaten voor de Proces-Industrie is the name of an organisation set up in The Hague to cover the Dutch process equipment industry. Chairman of the body is Mr. J. W. Ernste, director of the Shell Raffinaderij oil refining concern of Pernis, Rotterdam.

Shift of Demand in Italian Sulphur Industry

According to the Italian Sulphur Board (E.Z.I.), while the total quantity of sulphur produced has remained at the same level for the past three years, the pattern of the types of sulphur has changed. Under pressure of demand output has been shifting in favour of the more economical types (crude sulphur and concentrates) at the expense of molten sulphur.

During 1959-60, Italy absorbed the whole output of concentrated sulphur (49,328 tonnes) and 96,166 tonnes of molten sulphur (total produced 92,994). This is the first time in the history of the Italian sulphur industry that consumption of molten sulphur has exceeded output.

During the same year, 46,275 tonnes of sulphur were exported. This is an increase of about 26% compared with the 36,821 tonnes exported in 1958-59.

Derwent Gain Translation Rights of Soviet Patents

SOLE rights to the English translation of the official Soviet Bulletin of Patents for 1961 have been granted to the Derwent Information Service, 128 Theobalds Road, London W.C.1, in view of the D.I.S. record over many years of speedy publication of patent abstracts.

The cover-to-cover translation of the Soviet Bulletin will be issued fortnightly within six to eight weeks of publication of the Soviet text. Annual subscription will be £40 and the first issue will be on 15 March—a translation of the Soviet Bulletin of 15 January. This will be the only authorised translation.

It is stressed that the U.S.S.R. patent system is similar to that of West Germany and that foreigners can be reasonably sure of financial reward by applying for protection of worthwhile inventions in the U.S.S.R.

Derwent recently published a pamphlet dealing with Soviet patent law and procedure, copies of which are available on request. Also available is a pamphlet by the same author, Mr. M. Hyams, F.R.I.C., on Japanese patent law and procedure.

A.E.I. Sells Mass Spectrometer to U.S. Radio Firm

An order worth more than £20,000, for a 3½ ton mass spectrometer has been received by Associated Electrical Industries from the Radio Corporation of America.

Saharan Gas

(Continued from page 355)

But perhaps the most telling point made by the Ministerial spokesmen is that the gas industry must find ways of expanding its sales to the domestic consumer, whose demands are the backbone of the industry. To do this, it has to find ways and means of stabilising the price. It remains to be seen how far the Lurgi process and imported methane will go to achieving this object; certainly the latter will play an important part.

PEOPLE in the news

● **Mr. A. H. Loveless, M.Sc., A.R.C.S., D.I.C.,** technical director, Albright and Wilson (Mfg.) Ltd., of Oldbury, Birmingham, has been appointed vice-chairman of the company. **Mr. D. W. Livingstone** and **Mr. T. H. Tod** become directors.

● Three new directors appointed by Riker Laboratories Ltd., Morely Street, Loughborough, Leics, are **Mr. E. A. Burfoot, B.Sc., F.R.I.C., M.P.S.,** as works director, **Mr. T. A. J. James,** as administrative director and **Mr. R. W. Richards, B. Pharm, F.P.S.,** as sales director.

● **Mr. Philip V. Colebrook, A.M.I.Chem.E.,** 36, managing director of Pfizer Ltd., has been appointed chairman of all companies within the Pfizer Group. He succeeds **Mr. Richard C. Fenton** who has been appointed an operations vice-president of Pfizer International, with headquarters in New York and with responsibility for the company's operations in Europe, the Middle East, Africa and Canada. Mr. Fenton laid the foundations of the Pfizer organisation in Britain in 1951 and, during his 10 years' association with it, he has seen it grow into a group of more than 2,500 people. Mr. Colebrook joined Pfizer in 1952 as works and production manager. He became one of the youngest directors of the Pfizer organisation in 1956 at the age of 32

Philip V. Colebrook

when he was elected to the board of Pfizer Ltd. At that time he also became responsible for building up the company's research and development activities. In 1958 he was appointed managing director of Pfizer Ltd., and took responsibility for all companies in the Pfizer Group except Kemball, Bishop and Co. Ltd., of which he also became managing director in 1960.

● **Mr. D. D. Rintoul** has been appointed joint overseas sales controller, for Williams (Hounslow) Ltd., aniline dye makers, Hounslow, Middx, and not sales controller as stated in C.A., 25 February, p. 334. The new sales development officer is **Mr. A. F. H. Miller,** and not Mr. A. F. Miles as stated.

● **Mr. W. J. Lloyd,** managing director, has been appointed chairman of William R. Warner and Co. Ltd. and associate companies, Richard Hudnut Ltd. and Lambert Chemical Co. Ltd. The group of companies manufacture a wide range of pharmaceutical, cosmetic, toiletry and 'home perm' products at Eastleigh, Hants. Mr. Lloyd (50) leads the group as chairman after a successful period as managing director. **Mr. L. Coombs** has been appointed group managing director. As former director in charge of U.K. operations for Aspro-Nicholas Ltd., and later as managing director of Mead Johnson Ltd., Mr. Coombs' background is one of considerable experience in the pharmaceutical industry. He is particularly interested in the export market in which William R. Warner has a large volume of business.

● **Dr. H. L. Richardson,** head of the agricultural overseas section, I.C.I., Billingham Division, and president of the Fertiliser Society, has been seconded to the Food and Agricultural Organisation in Rome, for two years as project manager of F.A.O.'s fertiliser programme. This is a world-wide scheme, financed by the fertiliser industry as a contribution to the Freedom from Hunger Campaign, which aims at increasing food production in the underdeveloped countries by demonstrating the effective use of fertilisers.

● Two former directors of I.C.I. Lime Division, **Mr. F. C. Covill** and **Mr. C. S. Hall,** retired from the Company on 28 February. When Lime Division was absorbed into I.C.I. Alkali Division last year both became Alkali Division local directors at Buxton, former headquarters of the Lime Division. Mr. Colvill became a Lime Division director in 1945 with responsibility for production and personnel. Mr. Hall became Lime Division commercial director in 1948.

● **Major F. D. Outridge, R.A. (Retd.), F.C.C.S.,** has been appointed assistant to **Capt. R. A. Villiers, C.B.E.,** Director of the Scientific Instrument Manufacturers' Association, 20 Queen Anne Street, London W.1. He will be particularly responsible for the publicity and exhibitions of S.I.M.A. in the U.K. and overseas, and will also act in a secretarial capacity to the main committees.

● **Mr. Herbert W. Cremer, C.B.E., M.Sc., F.R.I.C., M.I.Chem.E.,** and **Mr. F. E. Warner, B.Sc., M.I.Chem.E.,** consulting chemical engineers, of 17 Queen Anne's Gate, London S.W.1, will be moving their office on 6 March to 8 Buckingham Palace Gardens, Westminster, London S.W.1, almost opposite the B.O.A.C. Victoria Terminal. Their new telephone number will be Sloane 0777.

● **Mr. E. T. Card** has been appointed a director of Electrothermal Engineering Ltd., 270 Neville Road, London E.7.

● **Dr. A. A. Rawlings, B.Sc., Ph.D., F.Inst.Pet.,** has been appointed manager of the operations and planning division of the British Petroleum Co. Ltd.'s Petroleum Chemicals Department.

● **Mr. J. Smethhurst,** sales manager of the Pigmentary Colours Division of the Geigy Company Ltd., Manchester, and a director of James Anderson and Co. (Colours) Limited, Paisley, will be in South Africa from 5 to 26 March. He will meet the companies' South African associates, Geigy South Africa, and will visit a number of the more important customers in the non-textile industries, with the object of increasing Geigy exports to South Africa of pigment dyestuffs and other non-textile chemicals and colouring materials.

Dr. Charles Franklin who, as stated last week, has been appointed research manager at the Barlaston works of Josiah Wedgwood and Son Ltd.

● **Mr. J. F. G. Wynne, B.Sc.,** has joined the board of W. J. Bush and Co. Ltd. as technical director in succession to **Mr. H. W. Vernon, B.Sc., F.R.I.C.,** who retired on 28 February, aged 65, after 45 years service with the company. Mr. Wynne joined the company in 1923 as a member of the Widnes Works chemical staff, where in recent years he has been manager and chief chemist. Retirement of Mr. Vernon, for personal reasons, is accepted with regret by the directors. He will continue his association with the company as a consultant. Mr. Vernon, a Mercer research scholar at Manchester University, joined W. J. Bush as research chemist when the research department was at the Dyson-Perrins Laboratory, Oxford. When the department was moved five years later to Hackney, he became chief research chemist in charge of research and development. He became chemical superintendent before his promotion as technical director.

● Istituto per le Pubbliche Relazioni in Milan has awarded the 1960 Vanoni Prize to **Count Carlo Faina,** president of Montecatini. The Vanoni Prize is awarded every year to an Italian for outstanding work in the field of public relations.

● **Mr. J. W. Haig-Ferguson, M.A., A.M.I.Mech.E., A.M.I.E.E., A.M.I. Prod.E.,** has been appointed managing director of R. and J. Beck Ltd., 68-71 Mortimer Street, London W.1, one of the Griffin and George Group, and manufacturers of optical instruments.

Commercial News

- **Blythe Colour May Set Up C.M. Plant**
- **D.C.L. Bid for Xylonite Now Unconditional**
- **Unilever Ltd. Profit Up by £2 million**
- **Bayer Apply for London Quotation**

Anchor Chemical

Group profits of Anchor Chemical for the year ended 30 November 1960 were £236,088 (£164,362). The dividend is raised from the equivalent of 13¼% to 17% with a final of 11%. The net profit after tax is £121,251 (£89,438).

Blythe Colour

Group net profit of Blythe Colour Works for 1960 was £192,972 (£174,438). Dividend payment totals 1s (equivalent 10.8d). Failing a merger of the two European trading blocs, the company believes that its trade with the Common Market will be lost to Continental firms. It may therefore be necessary to set up a factory within the Common Market. By a continuing policy of expansion and development, the company should be in a strong position to take advantage of the expected economic recovery as soon as it happens.

Boake Roberts

Group profit of A. Boake Roberts and Co. (Holding) for the 39 weeks ended 25 December, 1960, was £288,533 (£458,725 for the year). The balance after deducting the Albright and Wilson Group charge was £283,533.

British Xylonite

The Distillers Co. offer for British Xylonite has been declared unconditional. Acceptances from holders of over 90% of both preference shares and ordinary stock units have been received and the offer is extended until 13 March.

Hickson and Welch

Group turnover of Hickson and Welch (Holdings) for the first few months of the current year have been maintained, although profit margins were lower. Nevertheless, the dividends are expected to be maintained at the present rates.

Unilever

Combined turnover of Unilever Ltd. and Unilever N.V. last year totalled £1,847 million (£1,787 million) of which outside sales were £1,387 million (£1,329 million). Pre-tax profits were £106.1 million (£114.2 million), the U.K. Group contribution being £57.9 million (£55.9 million), while the profits of Unilever N.V. were £48.2 million (£58.3 million). Consolidated combined net profit was £51.7 million (£60.1 million).

Total dividend of Unilever Ltd. is 4s 9d per £1 share (4s 6½d) while Unilever N.V. will pay Fl.21 (Fl.20) per Fl.100 capital for 1960.

Naphtachimie

Naphtachimie of France, of whose capital a share of 42.78% is owned by Société Française des Pétroles B.P.—subsidiary of B.P.—announce for 1960 a turnover of N.Fr.111 million (N.Fr.86 million), after production of 70,000 (49,000) tonnes of chemical products. The B.P. subsidiary itself booked a 1960 turnover of N.Fr.1,620 million (N.Fr.1,550 million).

Farbenfabriken Bayer

Application has been made to the London Stock Exchange for a quotation for the DM735 million (£63 million) issued share capital of Farbenfabriken Bayer AG.

Parke Davis

The U.S. pharmaceutical concern, Parke, Davis and Co., announce for 1960 a net profit of $30,470,000 ($30,960,000), or $2.05 ($2.09) a share, after annual sales of $200 million ($191,500,000) and tax deductions of $28,400,000 ($30,700,000).

Pechiney

At the end of February, Péchiney opened a subscription for a loan made up of 1,250,000 5% bonds, each of N.Fr.200. Repayment will be in the 20 years following 1 March 1961, at a rate of 110% over the first 10 years and at 117½% over the final 10 years.

Petroplastique

The French petrochemical concern, Société Pétroplastique, has now been formally registered in Paris with a capital of N.Fr.15 million. The company, which is to produce 20,000 tonnes of polythene annually at a Le Havre plant, is owned jointly by Compagnie Française de Raffinage and Société El Paso France-Afrique, a subsidiary of the El Paso Natural Gas Products Co., of El Paso, Texas. Investments amounting to N.Fr.60 million are planned for the company's project.

INCREASES OF CAPITAL

ASPRO-NICHOLAS LTD., 16 Berkeley Street, London W.1. Increased by £2,500,000, beyond the registered capital of £3 million.

W. J. BUSH AND CO. LTD., manufacturing chemists, etc., 28 Ashgrove, London E.8. Increased by £300,000, beyond the registered capital of £2,000,000.

GRIFFIN AND GEORGE LTD., 285 Ealing Road, Alperton, Wembley. Increased by £300,000, beyond the registered capital of £700,000.

L. LIGHT AND CO. LTD., chemical manufacturers, etc., 15 Cromwell Road, London S.W.7. Increased by £46,000, beyond the registered capital of £4,000.

MANESTY MACHINES LTD., Evans Road, Speke, Liverpool 19. Increased by £499,900, beyond the registered capital of £100.

REDDISH CHEMICAL CO. LTD., Globe Works, Stanley Road, Cheadle Hulme, Ches. Increased by £15,000, beyond the registered capital of £5,000.

RAFFINERIES DU RHÔNE S.A., who plan to build Switzerland's first oil refinery at Colombey, are to raise their capital from S.Fr.15 million to S.Fr.25 million.

Market Reports

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A sustained demand characterises the coal tar products market with available supplies of most items finding a ready outlet. Naphthalene and pyridine are both in strong request.

MANCHESTER Traders on the Manchester chemical market report a satisfactory movement of the alkalis and other bread-and-butter lines to U.K. industrial consumers. Fresh business is on a moderate scale, with the bulk for prompt and early delivery parcels. Quotations generally have been well maintained. Most of the tar products continue in steady demand and growing activity has again been experienced for fertilisers. The shipping movement in general chemicals is satisfactory.

SCOTLAND There has been little change in trading conditions during the past week. Overall buying has been steady, and varied, with again the bulk being against immediate needs. Prices have more or less remained steady. There has been continued interest in the chemical export trade, which is reasonably active. Interest is also now developing in agricultural chemicals, mostly in the nature of enquiries.

BRITISH CHEMICAL PRICES

GENERAL CHEMICALS

Acetic Acid. 10-ton quantities, 80% tech. in bulk, £77 per ton; in casks, £90 per ton; 80% pure in bulk, £83; in casks, £94; glacial, 98/100% in bulk, £93; in drums, £100.

Acetic Anhydride. Ton lots d/d, £128.

Alum. Ground, f.o.r., about £25.
MANCHESTER: Ground, £25.

Aluminium Sulphate. Ex-works, d/d, £15 10s to £18.
MANCHESTER: £16 to £18.

Ammonia, Anhydrous. Per lb., 1s 9d-2s 3d.

Ammonium Chloride. Per ton lot, in non-ret. pack, £33 2s 6d.

Ammonium Nitrate. D/d, 4-ton lots, £37 10s.

Ammonium Persulphate. Per cwt., in 1-cwt. lots, d/d, £6 13s 6d; per ton, in min. 1-ton lots, d/d, £123 10s.

Ammonium Phosphate. MAP., £106 per ton; DAP, £100 10s., per ton, d/d.

Antimony Sulphide. Per lb., d/d UK in min. 1-ton lots; crimson, 5s 7d d/d to 6s 1d; golden, 3s 10d d/d per lb. to 5s 3d d/d.

Arsenic. Ex-store, £45 to £50.

Barium Carbonate. Precip., d/d, 4-ton lots or more, bag packing, £41 per ton.

Barium Chloride. 2-ton lots, £45.

Barium Sulphate [Dry Blanc Fixe]. Precip. 2-ton lots, d/d, £39.

Bleaching Powder. Ret. casks, c.p. station, in 4-ton lots. £30 7s 6d.

Borax. Ton lots, in hessian bags, c.p. Tech. anhydrous, £60 gran., £47 10s; crystal, £51; powder, £52; extra fine powder, £53; BP, gran, £56 10s; crystal, £59; powder, £61; extra fine powder, £60. In 6-ply paper bags, per ton, £59.

Boric Acid. Ton lots, in hessian sacks, c.p. Comm., gran., £78; crystal, £87; powder, £84 10s; extra fine powder, £86 10s; BP gran., £91; crystal, £99; powder, £96 10s; extra fine powder, £98 10s. Most grades in 6-ply paper bags, £1 less.

Calcium Chloride. Ton lots, in non-ret. pack; solid and flake, about £15.

Chlorine, Liquid. In ret. 16-17 cwt. drums d/d in 3-drum lots, £41.

Chromic Acid. Less 2½%, d/d UK, in 1-ton lots, per lb., 2s 2¾d.

Chromium Sulphate, Basic. Powder, d/d, per lb., 8½d; per ton, £79 6s 8d.

Citric Acid—Granular. In kegs, 1-4 cwt. lots, per cwt., £10 1s; 5-19 cwt. lots, per cwt., £9 17s; 1-ton lots, per cwt., £9 16s; packed in paper bags, 1-4 cwt. lots, per cwt., £9 13s; 5-19 cwt. lots, per cwt., £8 19s; 1-ton lots, per cwt., £9 9s.

Cobalt Oxide. Black, per lb., d/d, bulk quantities, 13s 2d.

Copper Carbonate. Per lb., 3s 6d.

Copper Sulphate. £75 15s per ton less 2% f.o.b. Liverpool.

Cream of Tartar. 100%, per cwt., about £11 12s.

Formaldehyde. In casks, d/d, £40.

Formic Acid. 85%, in 4-ton lots, c.p., £91.

Glycerine. Chem. pure, double distilled 1.2627 s.g., per cwt., in 5-cwt. drums for annual purchases of over 5-ton lots and under 25 tons, £12 1s 6d. Refined technical grade industrial, 5s per cwt. less than chem. pure.

Hydrochloric Acid. Spot, per carboy, d/d (according to purity, strength and locality), about 12s.

Hydrofluoric Acid. 60%, per lb., about 1s 2d.

Hydrogen Peroxide. Carboys extra and ret. 27.5% wt., £115; 35% wt., d/d, £138.

These prices are checked with the manufacturers, but in many cases there are variations according to quality, quantity, place of delivery, etc. Abbreviations: d/d, delivered; c.p., carriage paid; ret., returnable; non-ret. pack., non-returnable packaging; tech., technical; comm., commercial; gran., granular.

All prices per ton unless otherwise stated

Iodine. Resublimed BP, under 1 cwt., per lb., 11s 6d; for 1-cwt. lots, per lb., 11s 3d.

Iodoform. Under 1 cwt., per lb., 24s 1d; for 1-cwt. lots, per lb., 23s. 5d; crystals, 3s more.

Lactic Acid. Edible, d/d, 50% by wt., per lb., 16¾d; 80% by wt., 26½d; C.P., 50% by wt., per lb., 14½d; 80% by wt., 23d; dark tech., ex-works, 44% by wt., per lb. 9d. 1-ton lots, loaned containers.

Lead Acetate. White, about £154.

Lead Nitrate. 1-ton lots, about £135.

Lead, Red. Basic prices: 15-cwt. drum lots, Genuine dry red, £99 5s per ton; orange lead, £111 5s per ton; Ground in oil: red, £120 10s, orange, £132 10s.

Lead, White, Basic prices: in 5-cwt. drums, per ton for 2 ton lots, Dry English £112 5s; Ground in oil, £131 10s.

Lime Acetate. Brown, ton lots, d/d, £40; grey, 80-82%, ton lots, d/d, £45.

Litharge. In 5-cwt. drum lots, £101 5s per ton.

Magnesite. Calcined, in bags, ex-works, about £21.

Magnesium Carbonate. Light, comm., d/d, 2-ton lots, £84 10s under 2 tons, £97.

Magnesium Chloride. Solid (ex-wharf), £19 per ton.

Magnesium Oxide. Light, comm., d/d, under 1-ton lots, £245.

Magnesium Sulphate. Crystals, £13 10s, ex-works.

Mercuric Chloride. Tech. powder, per lb., for 1-ton lots, in 28-lb. parcels, 20s; 5-cwt. lots, in 28-lb. parcels, 20s 6d; 1-cwt. lots, in 28-lb. parcels, 20s 9d.

Mercury Sulphide, Red. Per lb. for 5-cwt. lots in 28-lb. parcels, £1 10s 6d; 1-cwt. lots, in 28-lb. parcels, £1 11s.

Nickel Sulphate. D/d, buyers UK, nominal, £170.

Nitric Acid. 80° Tw., £35 2s.

Oxalic Acid. Home manufacture, min. 4-ton lots, in 56 lb. paper bags, c.p., about £125-£130.

Phosphoric Acid. TPA 1,700, ton lots, c.p., £103; BP (s.g. 1,750), ½-ton lots, c.p., per lb., 1s 4d.

Potash, Caustic. Solid, 1-ton lots, £95 10s; liquid, £36 15s.

Potassium Carbonate. Calcined, 96/98%, 1-ton lots, ex-store, about £76.

Potassium Chloride. Industrial, 96%, 1-ton lots, about £24.

Potassium Dichromate. Gran., per lb., in 5-cwt. to 1-ton lots, d/d UK, 1s 2½d.

Potassium Iodide. BP, under 1 cwt, per lb., 9s 0d., per lb for 1-cwt lots, 8s 9d.

Potassium Nitrate. 4-ton lots, in non-ret. pack, c.p., £63 10s.

Potassium Permanganate. BP, 1-cwt. lots, per lb., 1s 11¾d; 3-cwt. lots, per lb., 1s 11¼d; 5-cwt. lots, per lb., 1s 10¾d; 1-ton lots, per lb., 1s 10½d; 5-ton lots, per lb., 1s 10d. Tech., 1-ton lots in 1-cwt. drums, per cwt., £9 18s; 5-cwt. in 1-cwt. drums, per cwt., £10; 1-cwt. lots, £10 9s.

Salammoniac. Ton lot, in non-ret. pack, £47 10s.

Salicylic Acid. MANCHESTER: Tech., d/d, per lb., 2s 6d, cwt. lots.

Soda Ash. 58% ex-depot or d/d, London station, 1-ton lots, about £16 11s 6d.

Sodium Acetate. Comm. crystals, d/d, £75 8s.

Soda, Caustic. Solid 76/77%; spot, d/d 1-ton lots, £33 16s 6d.

Sodium Bicarbonate. Ton lot, in non-ret. pack, £12 10s.

Sodium Bisulphite. Powder, 60/62%, d/d 2-ton lots for home trade, £46 2s 6d.

Sodium Carbonate Monohydrate. Ton lot, in non-ret. pack, c.p., £64.

Sodium Chlorate. 1-cwt. drums, c.p. station, in 5-ton lots, about £87 per ton.

Sodium Cyanide. 96/98%, ton lot in 1-cwt. drums, £126.

Sodium Dichromate. Gran. Crystals per lb., 1s. Net d/d UK, anhydrous, per lb., 1s 1¾d. Net del. d/d UK, 5-cwt. to 1-ton lots.

Sodium Fluoride. D/d, 1-ton lots and over, per cwt., £5; 1-cwt. lots, per cwt., £5 10s.

Sodium Hyposulphite. Pea crystals, £38; comm., 1-ton lots, c.p., £34 15s.

Sodium Iodide. BP, under 56 lb. per lb., 11s 3d; 56 lb. and over, 11s 0d.

Sodium Lactate. Edible, 75%, per ton, £168, d/d free drums, 1-ton lots.

Sodium Metaphosphate. Flaked, paper sacks, £136.

Sodium Metasilicate. (Spot prices) D/d UK in 1-ton lots, 1-cwt. free paper bags, £29.

Sodium Nitrate. Chilean refined gran. over 98%, 6-ton lots, d/d c.p., per ton, £29.

Sodium Nitrite. 4-ton lots, £32.

Sodium Perborate. (10% available oxygen) in 1-cwt. free kegs, 1-ton lots, £129 10s; in 1-cwt. lots, £139 5s.

Sodium Percarbonate. 12½% available oxygen, in 1-cwt. kegs, £170 15s.

Sodium Phosphate. D/d, ton lots: di-sodium, crystalline, £40 10s, anhydrous, £89; tri-sodium, crystalline, £39 10s, anhydrous, £87.

Sodium Silicate. (Spot prices) 75-84° Tw. Lancs and Ches., 6-ton lots, d/d station in loaned drums, £12 10s; Dorset, Somerset and Devon, per ton extra, £3 5s; Scotland and S. Wales, extra, £2 17s 6d. Elsewhere in England, not Cornwall, extra, £1.

Sodium Sulphate [Desiccated Glauber's Salt]. D/d in bags, about £19.

Sodium Sulphate [Glauber's Salt]. D/d, up to £14.

Sodium Sulphate [Salt Cake]. Unground, d/d station in bulk, £10.
MANCHESTER: d/d station, £10 10s.

Sodium Sulphide. 60/62%, spot, d/d, in drums in 1-ton lots, solid, £38 2s 6d; broken, £39 2s 6d. Flakes, £40 12s 6d, crystals, £29 10s.

Sodium Sulphite. Anhydrous, £71 10s; comm., d/d station in bags, £27-£28 10s.

Sulphur. 4 tons or more, ground, according to fineness, £20-£22.

Sulphuric Acid. Net, naked at works, 168° Tw. according to quality, £9 15s.—£11 7s 6d per ton; 140° Tw., arsenic free, £8 2s 6d; 140° Tw., arsenious, £7 17s 6d.

Tartaric Acid—Powder and Granular. Per cwt.: 10 cwt. or more, in kegs, 300s; in bags, 292s per cwt.

Titanium Oxide. Standard grade comm., rutile structure, £178; standard grade comm., anatase structure, £163.

Zinc Oxide. Per ton: white seal, £102 10s, green seal, £100 10s; red seal, £97 10s.

SOLVENTS AND PLASTICISERS

Acetone. All d/d. In 5-gal. drums, £124; in 10-gal. drums, £114; in 40-45 gal. drums, under 1 ton, £89; 1-5 tons, £84;

Commercial News

- **Blythe Colour May Set Up C.M. Plant**
- **D.C.L. Bid for Xylonite Now Unconditional**
- **Unilever Ltd. Profit Up by £2 million**
- **Bayer Apply for London Quotation**

Anchor Chemical

Group profits of Anchor Chemical for the year ended 30 November 1960 were £236,088 (£164,362). The dividend is raised from the equivalent of 13¼% to 17% with a final of 11%. The net profit after tax is £121,251 (£89,438).

Blythe Colour

Group net profit of Blythe Colour Works for 1960 was £192,972 (£174,438). Dividend payment totals 1s (equivalent 10.8d). Failing a merger of the two European trading blocs, the company believes that its trade with the Common Market will be lost to Continental firms. It may therefore be necessary to set up a factory within the Common Market. By a continuing policy of expansion and development, the company should be in a strong position to take advantage of the expected economic recovery as soon as it happens.

Boake Roberts

Group profit of A. Boake Roberts and Co. (Holding) for the 39 weeks ended 25 December, 1960, was £288,533 (£458,725 for the year). The balance after deducting the Albright and Wilson Group charge was £283,533.

British Xylonite

The Distillers Co. offer for British Xylonite has been declared unconditional. Acceptances from holders of over 90% of both preference shares and ordinary stock units have been received and the offer is extended until 13 March.

Hickson and Welch

Group turnover of Hickson and Welch (Holdings) for the first few months of the current year have been maintained, although profit margins were lower. Nevertheless, the dividends are expected to be maintained at the present rates.

Unilever

Combined turnover of Unilever Ltd. and Unilever N.V. last year totalled £1,847 million (£1,787 million) of which outside sales were £1,387 million (£1,329 million). Pre-tax profits were £106.1 million (£114.2 million), the U.K. Group contribution being £57.9 million (£55.9 million), while the profits of Unilever N.V. were £48.2 million (£58.3 million). Consolidated combined net profit was £51.7 million (£60.1 million).

Total dividend of Unilever Ltd. is 4s 9d per £1 share (4s 6½d) while Unilever N.V. will pay Fl.21 (Fl.20) per Fl.100 capital for 1960.

Naphtachimie

Naphtachimie of France, of whose capital a share of 42.78% is owned by Société Française des Pétroles B.P.—subsidiary of B.P.—announce for 1960 a turnover of N.Fr.111 million (N.Fr.86 million), after production of 70,000 (49,000) tonnes of chemical products. The B.P. subsidiary itself booked a 1960 turnover of N.Fr.1,620 million (N.Fr.1,550 million).

Farbenfabriken Bayer

Application has been made to the London Stock Exchange for a quotation for the DM735 million (£63 million) issued share capital of Farbenfabriken Bayer AG.

Parke Davis

The U.S. pharmaceutical concern, Parke, Davis and Co., announce for 1960 a net profit of $30,470,000 ($30,960,000), or $2.05 ($2.09) a share, after annual sales of $200 million ($191,500,000) and tax deductions of $28,400,000 ($30,700,000).

Pechiney

At the end of February, Péchiney opened a subscription for a loan made up of 1,250,000 5% bonds, each of N.Fr.200. Repayment will be in the 20 years following 1 March 1961, at a rate of 110% over the first 10 years and at 117½% over the final 10 years.

Petroplastique

The French petrochemical concern, Société Pétroplastique, has now been formally registered in Paris with a capital of N.Fr.15 million. The company, which is to produce 20,000 tonnes of polythene annually at a Le Havre plant, is owned jointly by Compagnie Française de Raffinage and Société El Paso France-Afrique, a subsidiary of the El Paso Natural Gas Products Co., of El Paso, Texas. Investments amounting to N.Fr.60 million are planned for the company's project.

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Potassium Iodide. BP, under 1 cwt, per lb., 9s 0d., per lb for 1-cwt lots, 8s 9d.

Potassium Nitrate. 4-ton lots, in non-ret. pack, c.p., £63 10s.

Potassium Permanganate. BP, 1-cwt. lots, per lb., 1s 11½d; 3-cwt. lots, per lb., 1s 11¼d; 5-cwt. lots, per lb., 1s 10¾d; 1-ton lots, per lb., 1s 10½d; 5-ton lots, per lb., 1s 10d. Tech., 1-ton lots in 1-cwt. drums, per cwt., £9 18s; 5-cwt. in 1-cwt. drums, per cwt., £10; 1-cwt. lots, £10 9s.

Salammoniac. Ton lot, in non-ret. pack, £47 10s.

Salicylic Acid. MANCHESTER: Tech., d/d, per lb., 2s 6d, cwt. lots.

Soda Ash. 58% ex-depot or d/d, London station, 1-ton lots, about £16 11s 6d.

Sodium Acetate. Comm. crystals, d/d, £75 8s.

Soda, Caustic. Solid 76/77%; spot, d/d 1-ton lots, £33 16s 6d.

Sodium Bicarbonate. Ton lot, in non-ret. pack, £12 10s.

Sodium Bisulphite. Powder, 60/62%, d/d 2-ton lots for home trade, £46 2s 6d.

Sodium Carbonate Monohydrate. Ton lot, in non-ret. pack, c.p., £64.

Sodium Chlorate. 1-cwt. drums, c.p. station, in 5-ton lots, about £87 per ton.

Sodium Cyanide. 96/98%, ton lot in 1-cwt. drums, £126.

Sodium Dichromate. Gran. Crystals per lb., 1s. Net d/d UK, anhydrous, per lb., 1s 1¾d. Net del. d/d UK, 5-cwt. to 1-ton lots.

Sodium Fluoride. D/d, 1-ton lots and over, per cwt., £5; 1-cwt. lots, per cwt., £5 10s.

Sodium Hyposulphite. Pea crystals, £38; comm., 1-ton lots, c.p., £34 15s.

Sodium Iodide. BP, under 56 lb. per lb., 11s 3d; 56 lb. and over, 11s 0d.

Sodium Lactate. Edible, 75%, per ton, £168, d/d free drums, 1-ton lots.

Sodium Metaphosphate. Flaked, paper sacks, £136.

Sodium Metasilicate. (Spot prices) D/d UK in 1-ton lots, 1-cwt. free paper bags, £29.

Sodium Nitrate. Chilean refined gran. over 98%, 6-ton lots, d/d c.p., per ton, £29.

Sodium Nitrite. 4-ton lots, £32.

Sodium Perborate. (10% available oxygen) in 1-cwt. free kegs, 1-ton lots, £129 10s; in 1-cwt. lots, £139 5s.

Sodium Percarbonate. 12½% available oxygen, in 1-cwt. kegs, £170 15s.

Sodium Phosphate. D/d, ton lots: di-sodium, crystalline, £40 10s, anhydrous, £89; tri-sodium, crystalline, £39 10s, anhydrous, £87.

Sodium Silicate. (Spot prices) 75-84° Tw. Lancs and Ches., 6-ton lots, d/d station in loaned drums, £12 10s; Dorset, Somerset and Devon, per ton extra, £3 5s; Scotland and S. Wales, extra, £2 17s 6d. Elsewhere in England, not Cornwall, extra, £1.

Sodium Sulphate [Desiccated Glauber's Salt]. D/d in bags, about £19.

Sodium Sulphate [Glauber's Salt]. D/d, up to £14.

Sodium Sulphate [Salt Cake]. Unground, d/d station in bulk, £10.
MANCHESTER: d/d station, £10 10s.

Sodium Sulphide. 60/62%, spot, d/d, in drums in 1-ton lots, solid, £38 2s 6d; broken, £39 2s 6d. Flakes, £40 12s 6d, crystals, £29 10s.

Sodium Sulphite. Anhydrous, £71 10s; comm., d/d station in bags, £27-£28 10s.

Sulphur. 4 tons or more, ground, according to fineness, £20-£22.

Sulphuric Acid. Net, naked at works, 168° Tw. according to quality, £9 15s.—£11 7s 6d per ton; 140° Tw., arsenic free, £8 2s 6d; 140° Tw., arsenious, £7 17s 6d.

Tartaric Acid—Powder and Granular. Per cwt.: 10 cwt. or more, in kegs, 300s; in bags, 292s per cwt.

Titanium Oxide. Standard grade comm., rutile structure, £178; standard grade comm., anatase structure, £163.

Zinc Oxide. Per ton: white seal, £102 10s, green seal, £100 10s; red seal, £97 10s.

SOLVENTS AND PLASTICISERS

Acetone. All d/d. In 5-gal. drums, £124; in 10-gal. drums, £114; in 40-45 gal. drums, under 1 ton, £89; 1-5 tons, £84;

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5-10 tons, £82; 10 tons and up, £80; in 500-gal. tank wagons, £79. In bulk minimum 2,500 gal. £75 per ton.

Butyl Acetate BSS. 10-ton lots, £165.

***n*-Butyl Alcohol BSS.** 10 tons, in drums, d/d, £137 10s.

***sec*-Butyl Alcohol.** All d/d. In 5-gal. drums, £168; in 10-gal. drums, £158; in 40-45 gal. drums, under 1 ton, £133: 1-5 tons £130; 5-10 tons, £129; 10 tons and up, £128; in 400-gal. tank wagons, £125.

***tert*-Butyl Alcohol.** 5-gal. drums, £195 10s; 40/45-gal. drums: 1 ton, £175 10s; 1-5 tons, £174 10s; 5-10 tons, £173 10s; 10 tons and up, £172 10s.

Diacetone Alcohol. Small lots: 5-gal. drums, £185; 10-gal. drums, £175. 40/45-gal. drums: under 1 ton, £148; 1-5 tons, £147; 5-10 tons, £146; 10 tons and over, £145, in 400-gal. tank wagons, £142.

Dibutyl Phthalate. In drums, 10 tons, d/d per ton, £216; 45-gal. 1-4 drums, £222.

Diethyl Phthalate. In drums, 10 tons, per ton, £201; 45-gal. 1-4 drums, £207.

Dimethyl Phthalate. In drums, 10 tons, per ton, d/d, £194; 45-gal. 1-4 drums, £200.

Dioctyl Phthalate. In drums, 10 tons, d/d, per ton, £287; 45-gal. 1-4 drums, £293.

Ether BSS. 1-ton lots, drums extra, per lb., 1s 11d.

Ethyl Acetate. 10-ton lots, d/d, £137.

Ethyl Alcohol Fermentation grade (PBF 66 o.p.). Over 300,000 p. gal., 3s 10½d; d/d in tankers, 2,500- 10,000 p. gal. per p. gal., 4s 0½d. D/d in 40/45-gal. drums, p.p.g. extra, 2d.
Absolute alcohol (74.5 o.p.), p.p.g. extra, 2d.

Methanol. Pure synthetic, d/d, £40.

Methylated Spirit. Industrial 66° o.p.: 500-gal. and up, d/d in tankers, per gal., 5s 7½d; 100-499 gal. in drums, d/d per gal., 6s 0½d-6s 2½d. Pyridinised 66° o.p.: 500 gal. and up, in tankers, d/d, per gal., 5s 11d; 100-499 gal. in drums, d/d, per gal., 6s 4d-6s 6d.

Methyl Ethyl Ketone. All d/d. in 40/45-gal. drums, under 1 ton, £143 10s; 1-5 tons, £138 10s; 5-10 tons, £136 10s; 10 tons and up, £143; in 400-gal. tank wagons, £134 10s.

Methyl *iso*Butyl Carbinol. All d/d. In 5-gal. drums, £203; in 10-gal. drums, £193; 40-45 gal. drums, less than 1 ton, £168; 1-9 tons, £165; 10 tons and over, £163; in 400-gal. tank wagons, £160.

Methyl *iso*Butyl Ketone. All d/d. In 5-gal. drums, £209; in 10-gal. drums, £199; in 40/45-gal. drums, under 1 ton, £174; 1-5 tons, £171; 5-10 tons, £170; 10 tons and up, £169; in 400-gal. tank wagons, £166.

***iso*Propyl Acetate.** 10 tons, d/d, 45-gal. drums £132.

***iso*Propyl Alcohol.** Small lots: 5-gal. drums, £118; 10-gal. drums, £108; 40/45-gal. drums: less than 1 ton, £83; 1-9 tons, £81; 10-50 tons, £80 10s; 50 tons and up, £80.

RUBBER CHEMICALS

Carbon Disulphide. According to quality, £61-£67.

Carbon Black. GPF: Ex-store, Swansea. Min. 3-ton lots, one delivery, 6¾d per lb.; min. 1-ton lots and up to 3-tons, one delivery, 7d. per lb.; ex-store, Manchester, London and Glasgow, 7¾d per lb. HAF: ex-store, Swansea; Min. 3-ton lots, one delivery, 7¾d per lb.; min. 1-ton lots and up to 3-tons, one delivery, 8d per lb. Ex-store Manchester, London and Glasgow, 8¾d per lb. ISAF: Ex-store Swansea, min. 3-ton lots in one delivery, 9¾d per lb., min. 1-ton lots and up to 3-tons in one delivery, 10d per lb. Ex-store Manchester, London and Glasgow, 10¾d per lb.

Carbon Tetrachloride. Ton lots, £83 15s.

India-Rubber Substitutes. White, per lb., 1s 4¾d to 1s 7d; dark, d/d, per lb., 1s 0¾d to 1s 4d.

Lithopone. 30%, about £57 10s for 5-ton lots.

Mineral Black. £7 10s-£10.

Sulphur Chloride. British, about £50.

Vegetable Lamp Black. 2-ton lots, £64 8s.

Vermilion. Pale or deep, 7-lb. lots, per lb., 15s 6d.

COAL TAR PRODUCTS

Benzole. Per gal., min. 200 gal., d/d in bulk, 90's, 5s 3d; pure, 5s 7d.

Carbolic Acid. Crystals, d/d bulk, per lb. 1s 3d; 40/50-gal. ret. drums extra, per lb., ¼d.

Creosote. Home trade, per gal., according to quality, f.o.r. maker's works, 1s-1s 9d.
MANCHESTER: Per gal., 1s 3d-1s 8d.

Cresylic Acid. Pale 99/100%, per gal., 7s 9d D/d UK in bulk: Pale ADF, per imperial gallon f.o.b. UK, 8s; per US gallon, c.i.f. NY, 103.50 cents freight equalised.

Naphtha. Solvent, 90/160°, per gal., 5s 3d. heavy, 90/190°, for bulk 1,000-gal. lots, d/d, per gal., 4s 1d. Drums extra; higher prices for smaller lots.

Naphthalene. Crude, 4-ton lots, in buyers' bags, nominal, according to m.p.: £22-£30; hot pressed, bulk, ex-works, £40; refined crystals, d/d min. 4-ton lots, £65-£68.

Pitch. Medium, soft, home trade, f.o.r. suppliers' works, £10 10s; export trade, f.o.b. suppliers' port, about £12.

Pyridine. 90/160, per gal., 18s about.

Toluol. Pure, per gal., 5s 2d; 90's 2,000 gal. in bulk, per gal., 5s 0d.
MANCHESTER: Pure, naked, per gal., 5s 6d.

Xylole. According to grade, in 1,000-gal. lots, d/d London area in bulk, per gal., 5s 7d-5s 8d.

INTERMEDIATES AND DYES
(Prices Normal)

***m*-Cresol 98/100%.** 10 cwt. lots d/d, per lb., 4s 9d.

***o*-Cresol 30/31°C.** D/d, per lb., 1s.

***p*-Cresol 34/35°C.** 10 cwt. lots d/d, per lb., 5s.

Dichloraniline. Per lb., 4s 6d.

Dinitrobenzene. 88/99°C., per lb., 2s 1d.

Dinitrotoluene. Drums extra. SP 15°C., per lb., 2s 1½d; SP 26°C., per lb., 1s 5d; SP 33°C., per lb., 1s 2½d; SP 66/68°C., per lb., 2s 1d.

***p*-Nitraniline.** Per lb., 5s 1d.

Nitrobenzene. Spot, 90 gal. drums (drums extra), 1-ton lots, d/d, per lb., 10d.

Nitroanphthalene. Per lb., 2s 5½d.

***o*-Toluidine.** 8-10 cwt. drums (drums extra), per lb., 1s 11d.

***p*-Toluidine.** In casks, per lb., 6s 1d.

Dimethylaniline. Drums extra, c.p., per lb., 3s 2d.

B.A. Annual Meeting

Annual meeting of the British Association for the Advancement of Science will be held at the University of Manchester from 29 August to 5 September 1961.

Chemical Safety Council Changes Address

Address of the British Chemical Industry Safety Council has been changed to Imperial House, 15 Kingsway, London W.C.2 (Temple Bar 0751).

TRADE NOTES

New I.C.I. Antioxidants

Nonox SP—chemically, a mixture of styrenated phenols—is a new antioxidant of the non-staining type for rubber, which has been introduced by the I.C.I. Dyestuffs Division. Although it has good non-staining properties, Nonex SP does not confer the high degree of protection against ageing that characterises Nonox WSL and Nonox WSP, but does offer a lower cost alternative where some sacrifice in ageing resistance can be accepted.

I.C.I. Dyestuffs Division have also developed Nonox EXP, a new, non-staining antioxidant recommended for white or coloured rubbers. It is a phenol condensation product, but is in the form of resinous beads. Nonox EXP stores satisfactorily at normal temperatures. It has a higher melting point (60-75°C) than Nonox EX, and a processing temperature sufficiently high to melt the beads is necessary. Nonox EXP can be used as direct replacement of Nonox EX in all cases.

Hydrazine Price Cut

Price cuts ranging from 5 to 15% according to concentration have been made for hydrazine by Whiffen and Sons Ltd., Loughborough, Leics. The only producers of hydrazine in the U.K. and the Commonwealth, Whiffen's have been able to make these substantial reductions to U.K. buyers because of steadily increasing output at the Loughborough plant which has necessitated extension of production facilities, according to Mr. A. Robinson, managing director. The price of Zerox (35% hydrazine), widely used for boiler feed water treatment, is also reduced.

Change of Address

From 6 March the London offices of British Glues and Chemicals Ltd. will be moved from Imperial House, Kingsway, to Berkshire House, 168-173 High Holborn, London W.C.1. Telephone number remains unchanged as Temple Bar 7777. Berkshire House is a new office block, of which British Glues will occupy the top five floors.

B.D.H. Chemicals

Additions to the B.D.H. range of laboratory chemicals include a water-soluble iodine indicator which has been developed as a substitute for starch in titrations involving iodine, and sodium diphenyl reagent for the determination of bromine and chlorine in organic compounds.

U.S. Equipment in U.K.

F. J. Stokes Corporation of Philadelphia, Pennsylvania, have established a subsidiary company in the U.K. with headquarters in London, to manufacture some of Stokes' range of machines and equipment for the plastics, chemical, pharmaceutical, automotive, electronics and food industries. These machines will be distributed throughout the British Isles, the Commonwealth, and E.F.T.A.

British manufacture of Stokes equipment is already under way in association with Thomas White and Sons Ltd., Paisley, Renfrewshire. In addition to the plastics moulding presses and Tornado mills which are in production in the U.K., other Stokes products include pharmaceutical tabletting presses, powder metal presses, vacuum metallising equipment, vacuum freeze-drying equipment.

Change of Name

From 28 February the name of the Mond Nickel Co. Ltd. an affiliate of the International Nickel Co. of Canada, is changed to the International Nickel Co. (Mond) Ltd.

P.V.A. Emulsion Paints

A completely revised booklet on polyvinyl acetate emulsion paints, which includes additional data, is available from British Titan Products Co. Ltd., 10 Stratton Street, London W.1. Information is contained on formulation, manufacture, stability, application properties and exterior durability of p.v.a. emulsion paints where pigmented with titanium oxide. Since the booklet was produced B.T.P. titanium pigments have been renamed as follows: Tioxide R-CR (formerly Rutiox CR), Tioxide R-HD (Rutiox HD), Tioxide R-SM (Rutiox SM), Tioxide A-HR (Anatase HR), Tioxide A-LF (Anatase LF), Tioxide A-DM (Anatase DM), Tioxide A-E (Anatase E), Tioxide granular (Anatase granular).

KEEBUSH

Keebush is an acid-resisting constructional material used for the construction of tanks, pumps, pipes, valves, fans, etc. It is completely inert to most commercial acids; is unaffected by temperatures up to 130°C; possesses a relatively high mechanical strength, and is unaffected by thermal shock. It is being used in most industries where acids are also being used. Write for particulars to—

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NEW PATENTS

By permission of the Controller, H.M. Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sales Branch), 25 Southampton Buildings, Chancery Lane, London W.C.2, price 3s 6d including postage; annual subscription £8 2s.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

ACCEPTANCES

Open to public inspection 6 April

Process for acylating or alkylating cyclopentadienyl carboxyl and compounds of manganese, ruthenium and osmium. Badische Anilin- & Soda-Fabrik. **864 834**

Method of producing fluorides of aromatic carboxylic acids. Wasag-Chemie AG. **864 746**

Alkylene-imino-quinones. Farbenfabriken Bayer AG. **864 747**

Fluorinated organosilicon compounds. Midland Silicones Ltd. **864 848**

4-Hydroxy-3-keto-steroids and derivatives. Soc. Farmaceutici Italia. [Divided out of 864 608.] **864 610**

4-Hydroxy steroid compounds and the preparation thereof. Soc. Farmaceutici Italia. **864 611**

Steroid compounds. Soc. Farmaceutici Italia. [Divided out of 864 607.] **864 612**

4-Substituted steroids. Soc. Farmaceutici Italia. [Divided out of 864 607.] **864 613**

Process for acylating polyoxymethylenes. Farbenfabriken Bayer AG. **864 403**

Thermoplastic compositions. Rhone-Poulenc **864 689**

4-Chlorotestosterone-17 β-acylates. Soc. Farmaceutici Italia. [Divided out of 864 607.] **864 614, 864 615**

Quinazoline 3-oxides and a process for the manufacture thereof. Hoffmann-La Roche & Co. AG., F. [Divided out of 864 824.] **864 825**

Process for the production of alkali metal and alkaline earth metal borohydrides. Studiengesellschaft Kohle. [Divided out of 864 616.] **864 617, 864 618**

Open to public inspection 12 April

Fluorinated polymers. T.I. (Group Services) Ltd **864 893**

Plastic coating of metals. Scott Bader & Co. Ltd. **864 879**

Metalliferous monoazo-dyestuff pigments and process for their manufacture. Ciba Ltd. **864 896**

Process for the production of quinols and for the manufacture of hydrogen peroxide therewith. Columbia-Southern Chemical Corp. **865 113**

Sprayable pigmented polyvinyl acetal compositions. Du Pont de Nemours & Co., E. I. **865 114**

Derivatives of DL-lysine. Uclaf. **865 157**

Corrosion inhibitors. Albright & Wilson (Mfg.) Ltd. **865 192**

Ureido compounds and lubricating greases containing same. Standard Oil Co. **864 898**

Polyethers. Pittsburgh Plate Glass Co. **865 067**

Process for the production of heptadecane-1:17-dicarboxylic acid. Ruhrchemie AG. **864 918**

Synthetic detergent mixtures. Union Carbide Corp. **864 919**

Polymers or copolymers containing phosphorus. Farbwerke Hoechst AG. **865 046**

Polymers containing phosphorus and a process for the manufacture thereof. Farbwerke Hoechst AG. **865 047**

Process for the production of 1:2-dichlorobutane-3:4-epoxide. Distillers Co. Ltd. **864 880**

Process for the production of 1-chloro-2:3-epoxy-4-hydroxybutane. Distillers Co. Ltd. **864 881**

Production of mixtures containing carbon monoxide and hydrogen. Texaco Development Corp. **864 930**

Process for the recovery of niobium and/or tantalum from mixtures of their pentahalides. Ciba Ltd. **864 883**

Process for the production of 2-chloro-3:4-epoxybutene-1. Distillers Co. Ltd. **864 882**

Preparation of polyglycidyl aromatic polyamines and resinous compositions made therefrom. Union Carbide Corp. **865 314**

Process for preparation of hydrogen peroxide. Food Machinery & Chemical Corp. **864 884**

Device for water purification. Kralovopolska Strojirna, Zavod Klementa Gottwalda, Narodni Podnik. **865 315**

Quaternary ammonium compounds and the preparation thereof. Wellcome Foundation Ltd. **864 885**

Polymers derived from bis-phenols and unsaturated acetals. Union Carbide Corp. **865 195**

Polymers derived from phenols and unsaturated acetals. Union Carbide Corp. **865 196**

Polymers derived from phenols, polyols and unsaturated acetals. Union Carbide Corp. **865 197**

Process for the polymerisation of olefins. Farbwerke Hoechst AG. **865 248**

Steroids and the manufacture thereof. Upjhon Co. **865 316**

Method of defluorinating phosphoric acid. International Minerals & Chemical Corp. **864 886**

Process for obtaining volatile fluorine compounds and for purifying metallic or carbide melts. Bäumert, P. A. F. **865 013**

Reinforced polythene laminates. Flexipane, Ltd. **865 250**

Dyestuffs of the naphthalene-1:8-dicarboxylic acid series and process for their manufacture. Farbwerke Hoechst AG. **864 872**

Process for the polymerisation of ethylenically unsaturated hydrocarbons. Bataafse Petroleum Maatschappij N.V. [Addition to 824 451.] **865 317**

Aminoplast textile finishing composition. British Industrial Plastics Ltd. **865 319**

Condensation products of quaternary salts of resinous C-vinylpyridine polymers with hydrazines containing quaternary nitrogen atoms and photographic films rendered anti-static therewith. Kodak Ltd. **864 874**

Oxidation resistant articles. Union Carbide Corp. **865 320**

Aluminium diglycinate complexes and their preparation. West Pharmaceutical Co. Ltd. **865 253**

Flotation reagents. Wrobel, S. A. **864 912**

Bromoethyl methylol phenols. Schenectady Varnish Co. Inc. **864 875**

Process of preparing bromomethyl methylol phenols. Schenectady Varnish Co, Inc. **864 876**

Method for the preparation of alphafluorinated organic compounds from active hydrogen compounds. Pennsalt Chemicals Corp. **865 321**

Hydrazine derivatives. Smith & Nephew Ltd., T. J. **865 254**

Hydrazine derivatives. Smith & Nephew Ltd., T. J. **865 255**

Process for the polymerisation of unsaturated compounds. Farbenfabriken Bayer AG. [Addition to 854 348.] **865 322**

Manufacture of linear polyureas. Toyo Koatsu Industries Inc. **864 888**

Peroxides. Laporte Chemicals Ltd. **865 324**

Process for preparing linear polyureas. Toyo Koatsu Industries Inc. **864 889**

Preparation of calcium carbide in a shaft furnace. Stamicarbon N.V. **865 325**

Process for stabilising halogen-containing polymers and copolymers. Farbenfabriken Bayer AG. **865 326**

Process for the treatment of titanium dioxide. Laporte Titanium Ltd. **865 327**

Monoazo dyestuffs of the azobenzene series. Imperial Chemical Industries Ltd. **865 328**

Polymerisation process. American Cyanamid Co. **865 330**

DIARY DATES

MONDAY 6 MARCH

C.S.—Cambridge: Univ. Chem. Lab., 5 p.m. 'Some molecular structure studies by microwave spectroscopy', by Dr. J. Sheridan.

C.S.—Oxford: Univ. Chem. Dept., 8.15 p.m. 'Carbon-14 compounds', by Dr. J. R. Catch.

I.Plant.E.—Chesterfield: Station Hotel, 7.30 p.m. 'Industrial diseases ; factory hygiene', by Dr. Hartley.

O.C.C.A.—London: Royal Horticultural Society's New Hall, Westminster, S.W.1. Thirteenth Technical Exhibition until 9 March.

Plastics Inst.—Leicester: Grand Hotel, 6.45 p.m. 'Shaping of acrylic & P.V.C. sheet materials', by P. H. Collins.

S.C.I.—London: 14, Belgrave Sq., S.W.1, 6.30 p.m. 'Chemical industry in Sweden', by Dr. A. Dahten.

TUESDAY 7 MARCH

I.Chem.E.—London: Burlington Hse., W.1, 4 p.m. 'Meeting on fluidisation'.

I.Plant.E.—London: R.S.A., John Adam St., W.C.2, 7 p.m. 'Maintenance of heat exchangers', by H. B. Merriman.

Plastics Inst.—London: Wellcome Bldg., Euston Rd., N.W.1. 6.30 p.m. 'Polyurethanes—developments & uses', by Dr. H. A. Hampton.

R.I.C.—Hatfield: Tech. Coll, 7 p.m. 'Some chemical problems of space flight', by D. Hurden.

WEDNESDAY 8 MARCH

Plastics Inst.—Cardiff: Angel Hotel, 6.30 p.m. 'Plastics in packaging', by G. Swift.

R.I.C.—London: Chelsea Coll. of Science & Technology, S.W.3, 6.30 p.m. 'Newer chemistry of bile acids and alcohols', by Prof. G. A. D. Haslewood.

S.A.C.—Luton: Tech. Coll., 6.30 p.m. 'Some newer reagents in analytical chemistry', by Prof. R. Belcher.

S.C.I.—London : Tate Gallery Restaurant, Millbank, S.W.1, 6.30 p.m. Food Group Conversazione.

THURSDAY 9 MARCH

C.S.—Aberystwyth: Edward Davies Chemical Labs., 5 p.m. 'Chemical processing of reactor fuels', by Dr. F. F. Kemp.

C.S. with R.I.C.—Univ. Chem. Dept., 7.30 p.m. 'I.R. spectra', by Dr. L. J. Bellamy.

C.S.—Leeds: Univ. Chem. Dept., 6.30 p.m. 'Phytol', by Prof. B. C. L. Weedon.

C.S.—Manchester: Coll. Science & Tech., 4.30 p.m. 'Some problems in chemistry of phosphorus', by Dr. S. H. Pollard.

C.S. with R.I.C.—Sheffield: Univ. Chem. Dept., 4.30 p.m. 'Electronic orbitals, shapes & spectra of simple molecules', by Prof. A. D. Walsh.

Plastics Inst.—Southampton: Univ. Chem. Dept., 7.30 p.m. 'Control instruments in plastics industrry', by J. A. Dugon.

S.C.I.—Bristol: Univ. Chem. Dept., 6 p.m. Bristol Section a.g.m., followed by meeting on 'Water treatment', with C.S. & R.I.C.

FRIDAY 10 MARCH

C.S.—Birmingham: Univ. Chem. Dept., 4.30 p.m. 'Very fast chemical reactions', by Prof. G. Porter.

C.S.—Cambridge: Univ. Chem. Dept., 8.30 p.m. 'Some aspects of radiation chemistry of aqueous systems', by Prof. J. Weiss.

C.S.—Exeter: Univ., Washington Singer Labs., 5 p.m. 'Spectra of gases & vapours under high-frequency excitation', by Prof. C. L. Wilson.

C.S.—Newcastle: King's Coll. Chem. Dept., 5.30 p.m. 'Some reflections on detergent industry', by Dr. A. Koebner.

I.Chem.E.—Manchester: Midland Hotel, 3.30 p.m. N.W. Branch a.g.m., followed by annual dinner-dance, 7 p.m.

S.A.C. with R.I.C.—Swansea: Univ. Coll., 6 p.m. 'Vapour phase chromatography', by A. Verdin.

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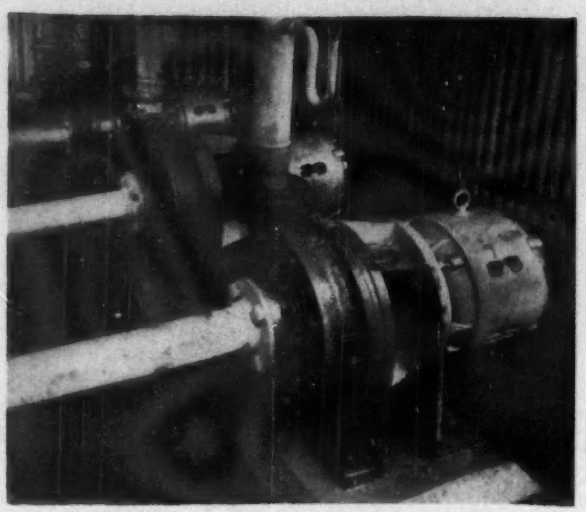

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